INL/EXT-17-42851
Revision: 0

Operation and Maintenance Manual for the Remote-Handled Low-Level Waste Disposal Facility Potable Water System

(PWS #6120030)

September 2017

The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance

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Operation and Maintenance Manual for the Remote-Handled Low-Level Waste Disposal Facility Potable Water System (PWS #6120030)

September 2017

Prepared for the
U.S. Department of Energy
Office of Nuclear Energy
Under DOE Idaho Operations Office
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ABSTRACT

This operation and maintenance (O&M) manual is the basic reference for O&M of the new equipment and processes that comprise the Remote-Handled Low-Level Waste (RHLLW) Disposal Facility potable water system, located in Butte County, Idaho at the Idaho National Laboratory (INL) site. The RHLLW Disposal Facility is operated for the United States Department of Energy Idaho Operations Office by Battelle Energy Alliance, LLC. Managers, operators, and maintenance personnel use the O&M manual and associated company and equipment manufacturer's procedures to operate the newly-installed RHLLW Disposal Facility potable water system for RHLLW Disposal Facility operations and personnel. The RHLLW Disposal Facility potable water system is under the jurisdiction of the Idaho Falls Regional Office of the Idaho Department of Environmental Quality (DEQ).

The RHLLW Disposal Facility is a new low-level radioactive waste disposal facility adjacent to the Advanced Test Reactor (ATR) Complex. The potable water to this new facility is supplied from the ATR Complex potable water distribution system via a 4-in. line approximately 1/2-mile in length. This line is a dead-leg and does not return to the ATR Complex system. The components of this system include point-of-use ultra-violet (UV) devices and filters; booster pumps; backflow prevention assemblies and isolation valves for the administration building and for the maintenance building; a blow-off valve and splash pad to support semi-annual flushing operations; and associated piping and support equipment.

The RHLLW Disposal Facility potable water system considered a consecutive system of the existing ATR Complex potable water system (PWS# 6120020). Additionally, the RHLLW Disposal Facility potable water system is considered a transient system since it does not regularly serve at least twenty-five of the same persons over six months per year. Submittal of this O&M manual to the DEQ fulfills a mandatory requirement to provide the DEQ with necessary information on the newly –constructed RHLLW Disposal Facility potable water system.

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ACRONYMS

ATR	Advanced Test Reactor
BFPA	Back Flow Prevention Assemblies
DEQ	Department of Environmental Quality
EDMS	Electronic Document Management System
GPM	Gallons per minute
HOA	Hand/Off/Auto
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
MFC	Materials and Fuels Complex
O&M	Operations and Maintenance
PLC	Programmable Logic Control
PMJ	Preventive Maintenance Justification
POU	Point of Use
PW	Potable Water
RHLLW	Remote-Handled Low-Level Waste
UV	Ultraviolet

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Operation and Maintenance Manual for the Remote-Handled Low-Level Waste Disposal Facility Potable Water System

1. INTRODUCTION

This operation and maintenance (O&M) manual is the basic reference for O&M of the new equipment and processes that comprise the Remote-Handled Low-Level Waste (RHLLW) Disposal Facility potable water system, located in Butte County, Idaho at the Idaho National Laboratory (INL) site. The RHLLW Disposal Facility is operated for the United States Department of Energy Idaho Operations Office by Battelle Energy Alliance, LLC. Managers, operators, and maintenance personnel use the O&M manual and associated company and equipment manufacturer's procedures to operate the newly installed RHLLW Disposal Facility potable water system in support of RHLLW Disposal Facility operations and personnel. The RHLLW Disposal Facility potable water system is under the jurisdiction of the Idaho Falls Regional Office of the Idaho Department of Environmental Quality (DEQ).

The RHLLW Disposal Facility potable water system receives water from the Advanced Test Reactor (ATR) Complex potable water distribution system. The new RHLLW Disposal Facility leg ties into the ATR Complex system south of ATR-1608 and is equipped with backflow prevention assembly (double check valve) and an isolation valve. This 4-in. RHLLW Disposal Facility supply line is then routed outside of the ATR Complex and to the RHLLW Disposal Facility where it supplies water to both the Administration Building (B21-631) and the Maintenance Building (B21-630); this line dead ends at the RHLLW Disposal Facility and does not loop back to the ATR Complex. Booster pumps are located in the RHLLW Disposal Facility Administration Building (B21-631) with backflow prevention assemblies and isolation valves installed at each building's service connection. Point-of use (POU) filters and ultra-violet (UV) disinfection units are installed at each faucet and shower location within each building to mitigate the effects of stagnant water. Since the supply line dead ends at the RHLLW Disposal Facility, a blow-off assembly and splash pad are installed on the RHLLW Disposal Facility side to facilitate performance of the semi-annual flush of the potable water supply line per DEQ requirements.

The Administration and Maintenance Buildings will not be occupied regularly. By nature of the process, personnel will occupy the facility only during waste shipments or when facility surveillance or maintenance is conducted. During periods of occupancy, a maximum of approximately twenty-five personnel are anticipated to be present.

2. OPERATION AND MANAGEMENT RESPONSIBILITY

2.1 Operator Responsibilities

The ATR Complex and RH LLW Disposal Facility potable water systems will be operated and maintained as two separate potable water systems. Document IAG-657, "Interface Agreement Between MFC and ATR for the RHLLW Disposal Facility" defines RHLLW Disposal Facility and ATR Complex responsibilities and controls and boundaries associated with the RHLLW Disposal Facility. The RH LLW Disposal Facility potable water system begins on the discharge side of the vault containing the new backflow prevention assembly and appurtenances that are installed at the potable water utility tie-in inside the ATR Complex. The RHLLW Disposal Facility potable water system (PWS # 6120030) is considered a consecutive system to the ATR Complex potable water system (PWS# 6120020) per the State of Idaho Department of Environmental Quality (DEQ# 15-05-12). Additionally, the RHLLW Disposal Facility is a transient system and, therefore, there is no requirement for a licensed Responsible

Charge Operator for this system. The RHLLW Disposal Facility will own, operate and maintain the potable water system and the point of use treatment devices downstream of the new backflow-prevention assembly vault located in the ATR Complex.

The ATR Complex operations personnel will notify the RHLLW Disposal Facility Supervisor of any potable water impairments that will impact the RHLLW Disposal Facility. RHLLW Disposal Facility Operations will notify the ATR Complex of any work on the RHLLW Disposal Facility-owned portion of the potable water line within the ATR Complex fence. RHLLW Disposal Facility Maintenance will perform the semi-annual flushing of the RHLLW Disposal Facility dead-ended main required by Idaho Administrative Procedures Act (IDAPA) 58.01.08 Section 542.09. These flushing activities will be coordinated with ATR Complex Operations, to include the ATR Complex Public Water System Responsible Charge Operator, to ensure that the flushing occurs on the back-shift.

2.2 Operator Training Requirements

The RHLLW Disposal Facility potable water system is classified as a consecutive system. In addition, the system is also designated as a transient system; therefore, there is no requirement for a licensed operator specific to the RHLLW Disposal Facility potable water system. The Operations personnel will be formally qualified on both the nuclear side and non-nuclear side of the RHLLW Disposal Facility. The nuclear side covers the disposal vaults and yard area and the non-nuclear side will include the remainder of the facility, which includes the Administration and Maintenance buildings and systems therein; the RHLLW Disposal Facility potable water system is included in the non-nuclear qualification (QNMFCOT, RHLLW Facility Technician). The training ensures a qualified operator possesses the knowledge of the system, the requirements associated with the system, and normal operations as well as how to respond to emergency and upset conditions. The build contractor for the RHLLW Disposal Facility is required to perform training of personnel to adjust, operate, and maintain the booster pumps prior to facility turnover. Additionally, a RHLLW Disposal Facility qualified shift supervisor is responsible for all operations and maintenance performed at the RHLLW Disposal Facility.

3. WASTEWATER PERMIT AND STANDARDS

3.1 Regulatory Requirements

The RHLLW Disposal Facility potable water system is a Transient Noncommunity Water System which is defined in IDAPA 58.01.08 as a “Noncommunity water system which does not regularly serve at least twenty-five (25) of the same persons over six (6) months per year”.

The RHLLW Disposal Facility water system must be operated in accordance with DEQ’s drinking water regulations as presented in IDAPA 58.01.08. These rules include requirements for submittal of engineering documents to DEQ for review and approval when modifications to the system are made.

Appendix E contains copies of vendor database files of major potable water components. These cut sheets show compliance with applicable requirements and standards (e.g., lead free, comply with drink water standards, etc.). Not included in Appendix E are minor components (faucets, etc.); these components meet design parameters, applicable standards and requirements as well. Records for these components are stored on the INL Vendor Data System and are available on request.

4. GENERAL PLANT DESCRIPTION

4.1 Facility Description

The RHLLW Disposal Facility potable water system is considered a consecutive system supplied by the ATR Complex potable water system. Downstream of the tie-in point inside the ATR Complex is a vault which contains isolation valves, a strainer, a water meter and a backflow prevention assembly. Components inside this vault are the responsibility of the ATR Complex; the responsibility of the

RHLLW Disposal Facility begins as the line exits the vault. The supply line continues approximately ½-mile to the RHLLW Disposal Facility where, prior to entering the Maintenance and Administration buildings, there are building isolation valves and the blow-off station and its splash pad. The blow-off station supports the semi-annual flushing of the potable water line to meet IDAPA regulations. As the supply line enters the Administration and Maintenance buildings each are equipped with isolation valves, a strainer, pressure indicators, a flowmeter and backflow prevention assemblies. The buildings will not be occupied regularly; therefore, there is a concern for stagnation of the water. As a precaution, and to compensate for this potential condition, each building has point-of-use UV and filter systems at each personnel use location (faucets, showers, etc.). The Administration Building is equipped with two booster pumps and a programmable logic controller (PLC) duplex control panel to maintain system pressures if building demands dictate. The booster pump control panel provides both automatic and manual pump control as well as system monitoring and alarm functions. The pump controller is programmed to operate pumps as necessary and to modulate pump speed to meet system demands. The pumps are each rated at 30 GPM at 42 feet of head.

4.2 Operation and Control

The ATR Complex distribution pumps provide RHLLW Disposal Facility flow at system pressures greater than 20 pounds per square inch (psi) (typically approximately 80 psi). RHLLW Disposal Facility booster pumps located in the Administration Building are available to increase water pressure as system demand dictates. The booster pumps are normally controlled automatically by a PLC control panel that incorporates system status, logic and timing functions. The panel features "Hand/Off/Auto" (HOA) switches for both pumps and manual bypass selector switches to control the pumps at full speed without control of the variable frequency drives.

The touch screen provides status of pumps, HOA and bypass switch positions, suction and discharge pressures and set points, and also allows setting of suction and discharge low and high pressure cutoffs. The system screen provides status of PLC inputs and outputs, setting of time and date, pump counts, alarm acknowledgement and reset, and analog input and output scale settings.

The controller is designed to operate two pumps in a duplex, alternating operation based on the input from the suction and discharge pressures. When in auto mode, the lead pump will energize in response to the discharge pressure set point and the actual discharge pressure. If the lead pump fails to activate or provide sufficient pressure, then the lag booster pump will activate when the system PSI is below the set point for activation of the lag condition and the lag activation delay timer. The system will automatically rotate the lead/lag duty at a preset time each day, assuming both pumps are available. This rotation is performed to equalize cumulative run times on the booster pumps. The pumps have a high pressure shutoff of 80 psig. If the inlet pressure is at or above this, then the pumps will not operate.

Operations personnel will use procedure RH-OI-2210, "Potable Water System", for startup, shutdown, and operation of the RHLLW Disposal Facility potable water systems in the Administration and Maintenance Buildings. This procedure requires sampling for bacteria if the system has been shut down for more than 7-days. Additionally, it requires that the UV lights must be in service for consumable water usage. A copy of this procedure is available in Appendix C.

4.3 Monitoring

Per IAG-657, the MFC RHLLW Disposal Facility-trained personnel are responsible for monitoring and operating the potable water system. Daily round sheet LOG-RH-A, "Daily Surveillance Log", is used to perform routine readings and system monitoring. LOG-RH-A will be used by operators to conduct surveillance on the potable water systems to include checking the booster pump room for leaks, checking water filters, and general conditions. MFC personnel will take appropriate actions if system or component anomalies are identified during these operator rounds. A copy of LOG-RH-A is included in Appendix B.

The ATR Complex potable water system is monitored for contaminants as required for transient noncommunity water systems (i.e., bacteriological, etc.) in compliance with federal and state regulations. The RHLLW Disposal Facility, being a consecutive system, is not required to perform these primary chemical analyses as they are performed by the purveyor (ATR Complex). The RHLLW Disposal Facility is required to perform quarterly bacteria sampling, TTHM/HAA5, and lead/copper sampling. The RHLLW Disposal Facility potable water system monitoring plan is included with the site wide Idaho National Laboratory Drinking Water Monitoring Plan (PLN-8530). The actual sampling is conducted per the Laboratory Instruction for Sampling of INL Public Water Systems (LI-361). A copy of the revised monitoring plan and sampling procedure is included as Appendix F.

4.4 Preventative Maintenance

Preventative maintenance is performed on system components to maintain operability and maximize the life of the potable water system. Preventative maintenance is performed by qualified personnel in accordance with approved maintenance work orders and instructions. The preventative maintenance requirements for the RHLLW Disposal Facility potable water system are established by the facility system engineer utilizing vendor O&M manuals, codes and regulations for guidance. A list of key vendors is attached as Appendix A.

Preventative maintenance for the RHLLW Disposal Facility potable water system is summarized below:

PWA-PMP-1 and -2 Potable Water Booster Pumps

1. The pumps are maintenance free; therefore no preventive maintenance will be performed.

PW-HOV-1 Potable Water Supply Line Flush

1. This preventive maintenance performs the semi-annual flush of potable water supply line. Water is supplied from ATR Complex and is flushed through the RHLLW Disposal Facility supply line and out at the blow-off station. The flow requirements are greater than 104 GPM for a minimum of 21 minutes.

PWA-BFP-1 and PWM-BFP-1 Backflow Prevention Assemblies

1. The work scope of this preventive maintenance is to inspect and test backflow prevention assemblies annually. This must be performed by personnel licensed with the DEQ. Note that responsibility for performing the preventive maintenance for the backflow preventer inside the ATR Complex vault is an ATR Complex responsibility. The preventive maintenance for the backflow prevention assemblies in each of the Administration Building and the Maintenance Building are the responsibility of the MFC RHLLW Disposal Facility.

PWA-UV-1 through -7 and PWM-UV-1 Ultraviolet Light Disinfection System

1. The 6-month preventive maintenance directs cleaning of the UV light's quartz sleeves per manufacturer's recommendations.
2. The 12-month preventive maintenance directs replacement of the UV lamps as recommended by the manufacturer.
3. The 24-month preventive maintenance directs replacement of the UV light's quartz sleeves as recommended by the manufacturer.

PWA-FIL-1 through -7 and PWM-FIL-1 Potable Water Filters

1. The 6-month preventive maintenance directs replacement of the water filter cartridges as recommended by the manufacturer.

A copy of the Preventative Maintenance Justification for each system component is attached in Appendix D.

4.5 System Dead Leg Flushing

The new 4-in. supply line was tied-into the ATR Complex potable water system south of ATR-1608. This 4-in. line creates a dead leg that is approximately 3030-feet long. IDAPA 58.01.08 requires that dead legs on potable water systems shall be flushed semi-annually. A Preventative Maintenance Justification for performing a flush of this piping dead leg is attached in Appendix G. An engineering calculation along with a drawing of the blow-off piping is also included in Appendix G. This dead leg will be flushed every 6-months at 104-gallons per minute or greater for a minimum of 21 -minutes to satisfy the flushing requirement. A concrete splash pad at the blow-off piping discharge will prevent erosion during flushing operations. These flushing activities will be performed by RHLLW Disposal Facility Maintenance and will be coordinated with ATR Complex Operations, including the ATR Complex PWS Responsible Charge Operator to ensure that flushing occurs on back-shift.

4.6 System Troubleshooting

Operations personnel are responsible for monitoring the potable water system. Any anomalies identified will be investigated and appropriate corrective actions performed.

Ultraviolet light alarm:

- UV light alarm – indicated lamp failure. Portion of system being served by the UV light will be tagged out-of-service and maintenance work request submitted for troubleshoot or replace the lamp. Fixtures downstream of the UV light will be tagged out-of-service.

Plugged filter:

- Operators will investigate the reason for a plugged filter. Corrective actions may include submission of a maintenance work order for filter replacement.

Leaks in system:

- Affected component tightened if applicable
- Monitor leak and submit maintenance work request for repair
- Isolate affected systems associated with leak and submit work request for repair

Pump not running when system demands:

- Operations personnel will investigate control panel alarms, parameters and set points to determine the issue. If operations personnel are unable to correct the problem, then a maintenance work request will be submitted to troubleshoot and repair the deficiency. The system will be operated in single pump mode until the issue is resolved.

Failed flow meter in Administration or Maintenance Building:

- Flowmeters are for information and not relied upon for proper system function. A maintenance work request will be submitted to correct the deficiency.

Failed backflow prevention assembly:

- This condition typically would be discovered during preventive maintenance, but issues may be identified during operator rounds. Backflow prevention assemblies must be repaired or replaced within 10 business days or the system isolated to comply with IDAPA 58.01.08 regulations.

Failed pressure gauge:

- Pressure gauges are for information and not relied upon for proper system function. A maintenance work request will be submitted to correct the deficiency.

5. REVISIONS

The RHLLW Disposal Facility potable water system utilizes a number of different procedures and documents to conduct operations, monitoring, and maintenance of the system. Some procedures and documents are system specific while others are laboratory-wide procedures. Revisions to any of these procedures and documents may occur for various reasons, e.g., operational experience, field changes, or regulatory changes. At the INL, all document revisions are maintained in the Electronic Document Management System (EDMS) or Asset Suite for maintenance work orders. Therefore, all operations, maintenance, and management personnel should verify that any procedure and document that they utilize is the most current revision recorded in EDMS. This will ensure that the potable water system is being operated, maintained, and monitored in accordance with the most current and best procedures and guidelines.

6. APPENDIXES

Appendix A, Manufacturer Product Information

Appendix B, LOG-RH-A

Appendix C, RH-OI-2210, Potable Water System

Appendix D, Preventative Maintenance

Appendix E, Equipment Vendor Instructions

Appendix F, Sampling/Monitoring Procedures

Appendix G, Dead Leg Flushing

Appendix H, List of Drawings

Appendix A

Manufacturer Product Information

Potable Water Booster Pumps
Grundfos CR 5-2 Pumps
Automated Flow Systems (AFS) Duplex VFD PLC Control Panel (PLC-DAX480)

Potable Water Backflow Preventer – Administration Building
Watts Series LF009-M2-QT; 2-in. inlet/outlet

Potable Water Backflow Preventer – Maintenance Building
Watts Series LF900-M2-QT; 1-in. inlet/outlet

Potable Water Ultra Violet Light System – Administration Building
Watts UV Disinfection System Model PWUV2110 (2gpm) with audible and visual alarm indicating lamp failure (for units PWA-UV-1, -2, -5, -6 and -7)
Watts UV Disinfection System Model PWUV6110 (6gpm) with audible and visual alarm indicating lamp failure (for units PWA-UV-3 and -4)

Potable Water Ultra Violet Light System – Maintenance Building
Watts UV Disinfection System Model PWUV2110 (2gpm) with audible and visual alarm indicating lamp failure

Potable Water Filters – Administration and Maintenance Building
PENTEK ECP Series
PENTEK Housing P150574; 3/4 in. #10 3G Standard integral bracket meter mount cap w/PR with P143549 3-color gauge
PENTEK Filter ECP5-10; Part 255482-43; 5-micron

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Appendix B

LOG-RH-A

LOG-RH-A
06/05/17
Rev. 0

DAILY SURVEILLANCE LOG
(Instructions on Page 4)

	Date				

Surveillance Item	ID No.	Range/Position/Status	Reading/Status Mon.	Tues.	Wed.	Thurs.	Fri.
		Time					
B21-631							
1. East Vestibule Door	N/A	Opens freely No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
2. East Building Entrance	N/A	Free of snow and ice No obstruction (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
3. Vehicle Gate	N/A	Free of snow and ice No obstruction (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
4. North Building Entrance(s)	N/A	Free of snow and ice No obstruction (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
5. Booster Pump Room (Room 121)	N/A	No leaks	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
		No obstructions	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
		Temperature > 50 – 90°F					
6. Fire Alarm Control Panel (Room 101)	FACP-0631-01	No alarms No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
7. North Vestibule Door	N/A	Opens freely No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
8. Water Filter(s) (Room 103)	PWA-FIL-6	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
	PWA-FIL-7	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
9. Tankless Water Heater Room (Room 103)	PWA-TWH-1	Reading from digital display					
	Temperature indicator	Temperature range >110-130°F					
10. Water Filter Men's Room (Room 104)	PWA-FIL-4	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
11. Water Filter(s) Women's Room (Room 106)	PWA-FIL-5	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
	PWA-FIL-3	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
12. Tankless Water Heater Room (Room 106)	PWA-TWH-2	Reading from digital display					
	Temperature indicator	Temperature range >110-130°F					
13. West Vestibule Door	N/A	Opens freely No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
14. West Building Entrance	N/A	Free of snow and ice No obstruction (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat

DAILY SURVEILLANCE LOG

(Instructions on Page 4)

Surveillance Item	ID No.	Range/Position/Status	Reading/Status				
			Mon.	Tues.	Wed.	Thurs.	Fri.
15. Water Filter Kitchen (Room 110)	PWA-FIL-1	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
	PWA-FIL-2	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
	N/A	Free of any obstructions (✓)					
16. Radio Check	N/A	Radio operational (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
17. General Walkthrough of Building	N/A	No abnormalities (✓)					
B21-630							
18. North Garage Door	N/A	Free of snow and ice No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
19. North Building Entrance	N/A	Free of snow and ice No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
20. Fire Riser Area	N/A	No leaks	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
		No obstructions	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
		Temperature > 50 – 90°F					
21. Tankless Water Heater (Room 105)	PWM-TWH-1	Reading from digital display					
	Temperature indicator	Temperature range >110 130°F					
22. Water Filter (Room 105)	PWM-FIL-1	Select the indicated range	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty	❑ clean ❑ change ❑ dirty
23. Fire Alarm Control Panel	FACP-0630-01	No alarms No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
24. Flammable-storage-cabinet check	N/A	No leaks or other apparent abnormalities (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
25. South Building Entrance	N/A	Free of snow and ice No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
26. South Garage Door	N/A	Free of Snow and Ice No obstructions (✓)	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat	❑ sat ❑ unsat
27. Eye Wash	LSM-EWS-1	No obstructions (✓)					
28. Diesel Exhaust Fan	DES-EF-1	S = Secured O = Operating (✓)	❑ S ❑ O	❑ S ❑ O	❑ S ❑ O	❑ S ❑ O	❑ S ❑ O
29. General Walkthrough of Building	N/A	No abnormalities (✓)					

DAILY SURVEILLANCE LOG

(Instructions on Page 4)

Completed and Reviewed By							
Completed by:	Monday	**Signature:**		**Time:**		**Date:**	
Reviewed by:	**Shift Supervisor**			**Time:**		**Date:**	
Completed by:	Tuesday	**Signature:**		**Time:**		**Date:**	
Reviewed by:	**Shift Supervisor**			**Time:**		**Date:**	
Completed by:	Wednesday	**Signature:**		**Time:**		**Date:**	
Reviewed by:	**Shift Supervisor**			**Time:**		**Date:**	
Completed by:	Thursday	**Signature:**		**Time:**		**Date:**	
Reviewed by:	**Shift Supervisor**			**Time:**		**Date:**	
Completed by:	Friday	**Signature:**		**Time:**		**Date:**	
Reviewed by:	**Shift Supervisor**			**Time:**		**Date:**	
Weekly Review:	**RH LLW Facility Management**	**Signature:**		**Time:**		**Date:**	

DAILY SURVEILLANCE LOG

INSTRUCTIONS

[1] OPS: Perform the following for RH LLW Facilities (B21-630 and B21-631):

- **[a]** Record the date and time started, perform surveillance in accordance with this log, and record results in black ink. Circle any out-of-specification readings in red ink and record the applicable item numbers and reason(s) (if known) in the Narrative Section.
- **[b]** Notify the Shift Supervisor (SS) of any deficiencies, abnormalities, or out-of-specification readings.
- **[c]** Record any strange or unusual noises/equipment failures and facility equipment status in the Narrative Section.
- **[d]** Obtain FRM-360, "Narrative Continuation Sheet," if more narrative sheets are required.
- **[e]** Sign and record the date and time completed in the log, retain the log in B21-631 Operations Office.

[2] Operator: Record the date and time complete, make notifications to the SS of any out-of-specification readings, any strange or unusual noises/equipment failures and facility equipment status noted during the surveillance.

[3] SS: Perform the following:

- **[a]** Review the log for out-of-specification readings/completeness.
- **[b]** If any deficiencies are identified, initiate a work request for any required repairs and notify the responsible systems engineer.
- **[c]** When completed, sign and date the log to indicate acceptance. At the end of the week, file the log in the designated location.

DAILY SURVEILLANCE LOG

Date/Time	NARRATIVE (Include date for the first entry of each day.)

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Appendix C

RH-OI-2210, Potable Water System

Form 412.09 (Rev. 10)

Idaho National Laboratory

POTABLE WATER SYSTEM	Identifier: RH-OI-2210 Revision: 0 Effective Date: 06/28/17 Page: 1 of 9

Materials and Fuels Complex	Laboratory Instruction	**USE TYPE 2**	eCR Number: 650032

Manual: MFC RH LLW Operating Instructions Manual (OI)

PROCEDURE REVIEW REQUIREMENTS PER SP-20.1.4			
DISCIPLINE	REVISION	DISCIPLINE	REVISION
ANALYTICAL RESEARCH LABORATORIES (AL, RCL)	N/A	MAINTENANCE	N/A
CHARACTERIZATION & ADVANCED PIE (EML, IMCL, SPL)	N/A	NUCLEAR SAFETY REVIEW	X
FUEL FABRICATION & NUCLEAR MATERIAL MANAGEMENT (EFF, FASB, FMF, ZPPR)	N/A	OUTSIDE REVIEW	N/A
POST-IRRADIATION EXAMINATION (HFEF, NRAD, MOCK-UP)	N/A	PACKAGING & TRANSPORTATION	N/A
PRODUCTION FACILITIES & INFRASTRUCTURE (BOP, FCF, RDF, INTEC, RSWF/TSDF, TREAT-WH)	N/A	QUALITY ASSURANCE	X
SPACE NUCLEAR POWER & ISOTOPE TECHNOLOGIES (SSPSF, 751, 772, 796, INTEC [RSTSF & 1634])	N/A	RADIOLOGICAL CONTROLS	X
CUI REVIEW	N/A	REMOTE-HANDLED LOW LEVEL WASTE (RH-LLW)	X
ENGINEERING	N/A	SAFEGUARDS & SECURITY	N/A
ENVIRONMENTAL	X	SAFETY & HEALTH (IH, IS)	X
FIRE PROTECTION	N/A	TRAINING	N/A
HOISTING AND RIGGING	N/A	WASTE GENERATOR SERVICES	N/A
INTER-FACILITY TRANSFERS	N/A		
*DOCUMENT OWNER OR QUALIFIED REVIEWER SHALL DETERMINE THE NEED FOR THESE REVIEWS BASED UPON THE SCOPE OF THE CHANGE AND THE HAZARDS IDENTIFIED			

REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	06/28/17	All	See eCR 650032. New Issue.

1. PURPOSE/SCOPE/APPLICABILITY

This document provides instructions for startup and operation of the Remote Handled Low-level Waste Disposal Facility (RH LLW) potable water system (PW).

The potable water system normally remains in continuous operation.

This procedure is performed by facility Operations (OPS) personnel.

The activities directed by this procedure have been designated Quality Level 3 per Quality Level Determination MSA-000221.

2. RISKS AND CONTROLS

Sequence of Basic Activities	Potential Hazard	Hazard Control
1. Hazardous/uneven walkways.	1. Falls, slips, and trips.	1) Removal of excess snow in work area; proper footwear for slick surfaces.
2. Weather conditions.	2. Personnel injury, slips, and falls.	1) Supervisor-established heat/cold stress stay times (when necessary) per LWP-14606.
3. Working in RH LLW Facility.	3. Snake/insect bites or stings.	3. 1) Work-area inspection for snakes/stinging insects prior to work. 2) RH LLW facility manager to have any snakes/biting insects found removed from the work area. 3) In case of bites or stings, notification of supervisor and immediate medical attention. 4) Because snakes may take shelter under material lying on the ground, caution when moving material lying on the ground undisturbed. No reaching under material until it is known there are no snakes under it.

2.1 Certification/Qualification/Training Required

2.1.1 Shift Supervisor (SS)

- QNRHLLSS, RH LLW Shift Supervisor.

2.1.2 Operator

- QNRHLLOP, RH LLW Nuclear Facility Operator.

2.2 Precautions/Limitations

2.2.1 Electrical control panels have internal operating systems of 480 Vac 3-phase and 120 Vac single phase.

NOTE: *A negative bacteria sample must be obtained prior to returning the potable water system to service.*

2.2.2 IF the potable water system has been shut down for more than 7 days, THEN contact environmental to obtain a bacteria sample on the potable water.

2.2.3 Ultraviolet bacteria-killing devices must be in service for consumable water usage.

3. PREREQUISITES

None.

4. FACILITY CONDITIONS

None.

5. INSTRUCTIONS

5.1 Routing Table

5.1.1 IF any of the activities in the following table are to be performed, **GO TO** the associated section or subsection and perform as directed; THEN return to this table.

Activity	Perform
Administrative Building PW Startup	Subsection 5.2
Maintenance Building PW Startup	Subsection 5.3

5.2 Administrative Building PW Startup

_____ 5.2.1 Complete the Administrative Building PW startup line-up in the order shown by positioning/verifying the position of the valves.

Administrative Building PW Startup Valve Line-up

Valve Number	Function	Position
PWA-HOV-44	PWA-P-1 Inlet Isolation Room 121	SHUT
PWA-HOV-5	PWA-P-1 Outlet Isolation Room 121	SHUT
PWA-HOV-46	PWA-P-2 Inlet Isolation Room 121	SHUT
PWA-HOV-6	PWA-P-2 Outlet Isolation Room 121	SHUT
PW-HOV-2	Administration Building Inlet Isolation Valve (Outside Valve Box)	OPEN
PWA-HOV-1	PWA-PI-1, PWA-FM-1 and PWA-STR-1 Inlet Isolation Room 121	OPEN
PWA-HOV-2	PWA-PI-1, PWA-FM-1 and PWA-STR-1 Oulet Isolation; PWA-BPF-1 Inlet Isolation Room 121	OPEN
PWA-HOV-3	PWA-BPF-1 Outlet Isolation: PWA-PI-2 Inlet Isolation Room 121	OPEN
PWA-HOV-8	PWA-PI-2 Outlet Isolation Room 121	OPEN
PWA-HOV-45	PWA-PI-5 Supply Pressure Indication and Control Isolation Room 121	OPEN
PWA-HOV-4	Booster Pump Bypass Isolation Valve Room 121	OPEN
PWA-HOV-7	PWA-PI-3 Discharge Pressure Indication and Control Isolation Room 121	OPEN
PWA-HOV-47	Distribution Isolation Valve Room 101	OPEN
PWA-HOV-9	PWA-FIL-6 and PWA-UV-6 Inlet Isolation Room 103	OPEN
PWA-HOV-10	PWA-FIL-6 and PWA-UV-6 Outlet Isolation Room 103	OPEN
PWA-HOV-11	PWA-FIL-6 and PWA-UV-6 Bypass Room 103	SHUT
PWA-HOV-12	PWA-TWH-1 Inlet Isolation Room 103	OPEN

Valve Number	Function	Position
PWA-HOV-13	PWA-TWH-1 Outlet Isolation Room 103	OPEN
PWA-HOV-14	PWA-FIL-7 and PWA-UV-7 Inlet Isolation (Hot Water) Room 103	OPEN
PWA-HOV-15	PWA-FIL-7 and PWA-UV-7 Outlet Isolation (Hot Water) Room 103	OPEN
PWA-HOV-16	PWA-FIL-7 and PWA-UV-7 Bypass (Hot Water) Room 103	SHUT
PWA-HOV-17	Supply Isolation To Bathrooms, Utility Room, and Kitchen	OPEN
PWA-HOV-18	Supply Isolation To Bathrooms, Utility Room, and Kitchen (Hot Water)	OPEN
PWA-HOV-20	PWA-FIL-5 Inlet Isolation Room 106	OPEN
PWA-HOV-21	PWA-FIL-5 Outlet Isolation Room 106	OPEN
PWA-HOV-22	PWA-FIL-5 Bypass Room 106	SHUT
PWA-HOV-43	PWA-TWH-2 Inlet Isolation Room 106	OPEN
PWA-HOV-23	PWA-TWH-2 Outlet Isolation Room 106	OPEN
PWA-HOV-19	Isolation to Room 110 (Hot Water)	OPEN
PWA-HOV-28	PWA-FIL-3 and PWA-UV-3 Inlet Isolation Room 107 (Hot Water)	OPEN
PWA-HOV-29	PWA-FIL-3 and PWA-UV-3 Outlet Isolation Room 107 (Hot Water)	OPEN
PWA-HOV-30	PWA-FIL-3 and PWA-UV-3 Bypass Room 107 (Hot Water)	SHUT
PWA-HOV-24	PWA-FIL-4 and PWA-UV-4 Inlet Isolation Room 105	OPEN
PWA-HOV-25	PWA-FIL-4 and PWA-UV-4 Outlet Isolation Room 105	OPEN
PWA-HOV-26	PWA-FIL-4 and PWA-UV-4 Bypass Room 105	SHUT
PWA-HOV-27	Supply Isolation To Room 110	OPEN
PWA-HOV-37	PWA-FIL-1 Inlet Isolation Room 110 (Hot Water)	OPEN

Valve Number	Function	Position
PWA-HOV-38	PWA-FIL-1 Outlet Isolation Room 110 (Hot Water)	OPEN
PWA-HOV-39	PWA-FIL-1 Inlet Bypass Room 110 (Hot Water)	SHUT
PWA-HOV-40	PWA-UV-1 Inlet Isolation Room 110 (Hot Water)	OPEN
PWA-HOV-41	PWA-UV-1 Outlet Isolation Room 110 (Hot Water)	OPEN
PWA-HOV-42	PWA-UV-1 Bypass Room 110 (Hot Water)	SHUT
PWA-HOV-31	PWA-FIL-2 Inlet Isolation Room 110	OPEN
PWA-HOV-32	PWA-FIL-2 OUTLET ISOLATION ROOM 110	OPEN
PWA-HOV-33	PWA-FIL-2 Bypass Room 110	SHUT
PWA-HOV-34	PWA-UV-2 Inlet Isolation Room 110	OPEN
PWA-HOV-35	PWA-UV-2 Outlet Isolation Room 110	OPEN
PWA-HOV-36	PWA-UV-2 Bypass Room 110	SHUT

5.2.2 If required, place a booster pump in operation as follows:

_____ 5.2.2.1 For PWA-P-1 complete the following:

Valve Number	Function	Position
PWA-HOV-44	PWA-P-1 Inlet Isolation Room 121	OPEN
PWA-HOV-5	PWA-P-1 Outlet Isolation Room 121	OPEN

_____ 5.2.2.1.1 From the PLC control panel, select AUTO for PWA-P-1.

_____ 5.2.2.1.2 SHUT PWA-HOV-4, Booster Pump Bypass.

_____ 5.2.2.2 For PWA-P-2 complete the following:

Valve Number	Function	Position
PWA-HOV-46	PWA-P-2 Inlet Isolation Room 121	OPEN
PWA-HOV-6	PWA-P-2 Outlet Isolation Room 121	OPEN

_____ 5.2.2.2.1 From the PLC control panel, select AUTO for PWA-P-2.

_____ 5.2.2.2.2 SHUT PWA-HOV-4, Booster Pump Bypass.

5.3 Maintenance Building PW Startup

_____ 5.3.1 Complete the Maintenance Building PW startup line-up in the order shown by positioning/verifying the position of the valves.

Maintenance Building PW Startup Valve Line-up

Valve Number	Function	Position
PW-HOV-1	Manhole Isolation Valve	SHUT
PW-DV-1	Manhole Drain Valve	OPEN
PW-HOV-3	Maintenance Building Inlet Isolation Valve (Outside Valve Box)	OPEN
PWM-HOV-1	PWM-PI-1, PWM-STR-1, and PWM-FM-1 Inlet Isolation Room 105	OPEN
PWM-HOV-2	PWM-PI-1, PWM-STR-1, and PWM-FM-1 Outlet Isolation; PWM-BFP-1 Inlet Isolation Room 105	OPEN
PWM-HOV-3	PWM-BFP-1 Outlet Isolation; PWM-PI-2 Inlet Isolation Room 105	OPEN
PWM-HOV-4	PWM-PI-2 Outlet Isolation and Supply to Room 105	OPEN
PWM-HOV-5	PWM-FIL-1 and PWM-UV-1 Inlet Isolation Room 105	OPEN
PWM-HOV-6	PWM-FIL-1 and PWM-UV-1 Outlet Isolation Room 105	OPEN
PWM-HOV-7	PWM-FIL-1 and PWM-UV-1 Bypass Room 105	SHUT
PWM-HOV-8	PWM-TWH-1 Inlet Isolation Room 105 (Hot Water)	OPEN
PWM-HOV-9	PWM-TWH-1 Outlet Isolation Room 105 (Hot Water)	OPEN

6. POST-PERFORMANCE ACTIVITIES

None.

7. ABNORMAL OPERATIONS

NOTE: *A negative bacteria sample must be obtained prior to returning the potable water system to service.*

7.1 IF the potable water system has been shut down for more than 7 days, THEN contact Environmental to obtain a bacteria sample on the potable water.

7.2 IF an ultraviolet (UV) light unit is out of service for more than 7 days, THEN remove the potable water system served by the unit from service until the UV light unit is repaired.

8. RECORDS

Executed copies of laboratory instructions: RH-OI-2210, "Potable Water System."

NOTE: *LWP-1202, "Records Management," the INL Records Schedule Matrix, and associated record types list(s) provide current information on the retention, quality assurance, and/or destruction moratorium requirements for these records. Contact a Records Coordinator for assistance if needed.*

9. REFERENCES

Drawings:

Dwg. 808182, "RH LLW Potable Water System"

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Appendix D

Preventative Maintenance

Preventive maintenance on the potable water system components is driven by regulations, standards, manufacturer recommendations and engineering judgement. A preventive maintenance justification (PMJ) is written and approved for each component type that details the component, frequency for performing the preventive maintenance, states the driving requirements and states basic scope. The following are approved PMJs applicable to the RHLLW potable water system; copies of the approved PMJ appear in the Appendix D.

- PMJ for Administration Building Backflow Prevention Assembly (PWA-BFP-1)
- PMJ for Administration Building Filter Replacement (PWA-FIL-1 through -7)
- PMJ for Administration Building Ultraviolet Light Quartz Sleeve Cleaning (PWA-UV-1 through -7)
- PMJ for Administration Building Ultraviolet Light Bulb Replacement (PWA-UV-1 through -7)
- PMJ for Administration Building Ultraviolet Light Quartz Sleeve Replacement (PWA-UV-1 through -7)
- PMJ for Maintenance Building Backflow Prevention Assembly (PWM-BFP-1)
- PMJ for Maintenance Building Filter Replacement (PWM-FIL-1)
- PMJ for Maintenance Building Ultraviolet Light Quartz Sleeve Cleaning (PWM-UV-1)
- PMJ for Maintenance Building Ultraviolet Light Bulb Replacement (PWM-UV-1)
- PMJ for Maintenance Building Ultraviolet Light Quartz Sleeve Replacement (PWM-UV-1)
- PMJ for Flushing Potable Water Supply Line (Refer to Appendix G)
- PMJ for Potable Water Booster Pumps – No preventive maintenance; run to failure

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MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

AR 1099

PM Justification/Change Tracking Number: PMID 10221					
Initiated by: A. R. Prather	63363	7/14/16			Phone 3-7473
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM
Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)					
Building B21-631	MEL System 2212	MEL Equipment ID(s) PWA-BFP-1	Equipment Name Potable water backflow preventer in Administration Building	Critical Equipment ☒ Yes ☐ No	
Asset Suite Data (if known)					
Model Work Order 236773	Frequency 12 M	Critical PM ☒ Yes ☐ No		Grace Period -30 +0 days	

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Perform 12 month inspections and testing of backflow preventer per LI-370 using a qualified cross connection control technician.

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

State of Idaho IDAPA 58.01.08, section 552.06.c.

Company Requirement in LWP-8000, Section 4.10

Laboratory Instruction LI-370 requirements

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A Prather	Date 7-19-16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/20/16
Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16
Maintenance Review			
Cost-Benefit (For New PM Only)		N/A for regulatory driven PM ☒	
Comments:			

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07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

Maintenance Reviewer	Print Robert Belcher	Signature Robert Belcher	Date 7/25/16
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print Kim Hall	Signature Kim Hall	Date 9-6-16

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07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

PM Justification/Change Tracking Number	AR1164	PMND 10223	
Initiated by: A. R. Prather	63363	7/14/16	Phone 3-7473

Change Type – Select all that apply

☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM

Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)

Building	MEL System	MEL Equipment ID(s)	Equipment Name	Critical Equipment
B21-631	2210	PWA-FIL-1 through -7	Administration building potable water disinfection system filters	☐ Yes ☒ No

Asset Suite Data (if known)

Model Work Order 236782	Frequency 6 month	Critical PM ☐ Yes ☒ No	Grace Period ±25

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Replace filter cartridge every 6 months

- Pentek 3G standard series housing (Part # 150574)
- Pentek ECP5-10 filters (Part # 255482-43)

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Industry standard and best management practice for potable water systems

Proposed Start Date and Justification:

Based on completion of construction and activation of components

Engineering Technical Basis Review

System Engineer	Print A. R. Prather	Signature A R Prather	Date 7-18-16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/19/16

Operations Review

Comments:

Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16

Maintenance Review

Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards ☐ N/A for regulatory driven PM

Comments:

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Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

Maintenance Reviewer	Print Robert Bekker	Signature Robert Bekker	Date 7/25/16

Implementation and Closure

PM Coordinator • Asset Suite updated	Print J. GAFFNEY	Signature Julie Gaffney	Date 9/6/2016

PENTAIR

PENTEK 3G STANDARD SERIES FILTER HOUSINGS

VERSATILE DESIGN ACCEPTS MULTIPLE CARTRIDGE SIZES IN A VARIETY OF APPLICATION SETTINGS

*Shown with differential gauge. Gauges sold separately.

Pentair‡ Pentek‡ 3G Standard Series Housings feature integral brackets, 20" clear housings, and caps for differential pressure gauges. They accept standard double open end (DOE) and our O-ring sealing cartridges. The O-ring design offers enhanced cartridge sealing for critical cartridge applications.

3G Standard Filter Housings are manufactured from durable polypropylene or clear Styrene-Acrylonitrile (SAN). Reinforced polypropylene housings have excellent chemical resistance and are ideal for many residential, commercial and industrial applications. Clear sumps are manufactured from Styrene-Acrylonitrile (SAN). They offer on-site examination of the cartridge and have excellent chemical compatibility.

All are equipped with 3/4" NPT inlet and outlet ports. 3G Standard Filter Housings are available in 10" and 20" lengths and will accommodate a wide range of 2-1/4" to 3-1/8" diameter cartridges.

FEATURES/BENEFITS

- Integral bracket and mounting boss cap versions available
- Available in 10" and 20"sumps in clear and opaque
- Buttress threads and uniform walls for easier cartridge change and improved strength
- Accepts double O-ring sealing cartridges as well as standard DOE cartridges
- Optional pressure-relief/bleed button and differential pressure gauge
- Leak-proof seal

SPECIFICATIONS

- Housing – Polypropylene (opaque) or Styrene Acrylonitrile (clear)
- Cap – Reinforced Polypropylene
- Button Assembly – 300 Series stainless steel, EPDM, and polypropylene
- O-Ring – Buna-N
- Temperature Rating – 40-125°F (4.4-51.7°C)
- Maximum Pressure – 125 psi (8.6 bar)

Manufacture is unable to provide a clear housing with meter mount cap

F-1 THROUGH F-7 FILTER HOUSING

PERFORMANCE

PART #	DESCRIPTION	MAXIMUM DIMENSIONS	INITIAL ΔP (PSI) @ FLOW RATE (GPM)
150542	3/4" #10 3G Standard Black/Blue Mounting Bracket Cap w/PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150546	3/4" #10 3G Standard Black/Blue Mounting Bracket Cap w/o PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150558	3/4" #10 3G Standard Blue/Clear Mounting Bracket Cap w/PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150587	3/4" #10 3G Standard Black/Clear Mounting Bracket Cap w/PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150550	3/4" #10 3G Standard Black/Blue Integral Bracket Cap w/PR	13.25" x 5.75" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150566	3/4" #10 3G Standard Blue/Clear Integral Bracket Cap w/PR	13.25" x 5.75" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150574	3/4" #10 3G Standard Black/Blue Integral Bracket Meter Mount Cap w/PR	13.25" x 5.75" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150544	3/4" #20 3G Standard Black/Blue Mounting Bracket Cap w/PR	23" x 5.38" (584 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150560	3/4" #20 3G Standard Blue/Clear Mounting Bracket Cap w/PR	23" x 5.38" (584 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150564	3/4" #20 3G Standard Blue/Clear Mounting Bracket Cap w/o PR	23" x 5.38" (584 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150552	3/4" #20 3G Standard Black/Blue Integral Bracket w/PR	23.50" x 5.75" (597 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150568	3/4" #20 3G Standard Blue/Clear Integral Bracket w/PR	23.50" x 5.75" (597 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)

CAUTION: Protect against freezing to prevent cracking of the filter and water leakage.

ACCESSORIES

PART #	DESCRIPTION
143549	3 Color Gauge for Meter Mount Cap
143550	2 Color Gauge for Meter Mount Cap
150295	SW-2 Wrench for Standard
155003	Cartridge Coupler for Standard Cartridges
151120	Buna-N #241 O-ring for Standard
151117	Viton #241 O-ring for Standard
151118	Silicone #241 O-ring for Standard
150578	MC-1A Kit - Zinc Plated Bracket for Standard
244043	MC-1A - Zinc Plated Bracket ONLY for Standard
244686	Two-Housing Standard System Bracket
244687	Three-Housing Standard Bracket

143549*

143550*

*Gauges sold separately.

PENTAIR

WATER QUALITY SYSTEMS
5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209
P: 262.238.4400 | F: 262.238.4404
WATERPURIFICATION.PENTAIR.COM
CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

310103 REV D MY15

PENTAIR

PENTEK ECP SERIES
PLEATED CELLULOSE POLYESTER CARTRIDGES

HIGHER WET STRENGTH THAN REGULAR CELLULOSE CARTRIDGES

Pentair[1] Pentek[1] ECP Series Cartridges are manufactured from a special formulation of resin-impregnated cellulose and polyester fibers.

This unique blend of materials provides a higher wet strength than regular cellulose cartridges. It also provides high flow rates and dirt-holding capacity while maintaining extremely low pressure drop.

The media is pleated around a polypropylene core for added strength. The pleated endcaps of the standard cartridges are immersed in a thermo-setting vinyl plastisol. The Big Blue cartridges have a molded endcap with gaskets. The pleated ends are sealed to the endcap with a thermoplastic adhesive. The overlap seam is sonically welded to reduce internal bypass, improving filtration efficiency.

ECP Series Cartridge endcaps feature a color-coding system for easy identification of micron ratings: tan (1 micron), white (5 micron), blue (20 micron), and yellow (50 micron).

ECP Series Cartridges contain more media surface area than most competitive cartridges. The Standard 10" ECP cartridge contains 6 ft² of media while most cartridges contain only 4.5 ft². Other available ECP cartridge sizes contain the following amount of media:

- **Standard 10" cartridge: 6 ft²**
- **Standard 20" cartridge: 12 ft²**
- **BB 10" cartridge: 18 ft²**
- **BB 20" cartridge: 36 ft²**

FEATURES/BENEFITS

Replaces Pentek CP and HFCP Series Cartridges

Special formulation of resin-impregnated cellulose and polyester fibers

Provides higher wet strength than regular cellulose cartridges

Minimal unloading and media migration

Nominal 1, 5, 20, 50 micron rating

Lengths: 10", 20"

SPECIFICATIONS

Filter Media – Cellulose polyester

Standard Endcaps – Vinyl plastisol

Big Blue Endcaps – Polypropylene

Core – Polypropylene

Temperature Rating – 40-125°F (4.4-51.7°C)

SPECIFICATIONS AND PERFORMANCE

MODEL #	PART #	ENDCAP COLOR	MAXIMUM DIMENSIONS	RATING (NOMINAL)	INITIAL (PSI) @ FLOW RATE (GPM)
ECP1-10	255481-43	Tan	2.63" x 9.75" (67 mm x 248 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-10	255482-43	White	2.63" x 9.75" (67 mm x 248 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-10	255483-43	Blue	2.63" x 9.75" (67 mm x 248 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-10	255484-43	Yellow	2.63" x 9.75" (67 mm x 248 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-20	255485-43	Tan	2.63" x 20" (67 mm x 508 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-20	255486-43	White	2.63" x 20" (67 mm x 508 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-20	255487-43	Blue	2.63" x 20" (67 mm x 508 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-20	255488-43	Yellow	2.63" x 20" (67 mm x 508 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-BB	255489-43	Tan	4.5" x 9.75" (114 mm x 248 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-BB	255490-43	White	4.5" x 9.75" (114 mm x 248 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-BB	255491-43	Blue	4.5" x 9.75" (114 mm x 248 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-BB	255492-43	Yellow	4.5" x 9.75" (114 mm x 248 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP1-20BB	255493-43	Tan	4.5" x 20" (114 mm x 508 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-20BB	255494-43	White	4.5" x 20" (114 mm x 508 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-20BB	255495-43	Blue	4.5" x 20" (114 mm x 508 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-20BB	255496-43	Yellow	4.5" x 20" (114 mm x 508 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)

WARNING: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

PENTAIR

WATER QUALITY SYSTEMS
5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209
P: 262.238.4400 | F: 262.238.4404
WATERPURIFICATION.PENTAIR.COM
CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

310111 REV D MY15

PMID 10217-03

FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

PM Justification/Change Tracking Number: AR # 1167					
Initiated by: A. R. Prather	63363	7/14/16	Phone 3-7473		
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM
Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)					
Building B21-631	MEL System 2210	MEL Equipment ID(s) PWA-UV-1 thru -7	Equipment Name Administration building potable water disinfection system UV lights	Critical Equipment ☐ Yes ☒ No	
Asset Suite Data (if known)					
Model Work Order 2366626	Frequency 6 month	Critical PM ☐ Yes ☒ No	Grace Period ±25		

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Perform cleaning of quarts sleeves in the potable water UV disinfection units every 6 months (see attached maintenance documents for steps).

NOTE: lamps and sleeves are damaged easily; ensure careful handling. Clean with glass cleaner

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Manufacturer recommendation

Proposed Start Date and Justification:

Based on completion of construction and activation of component

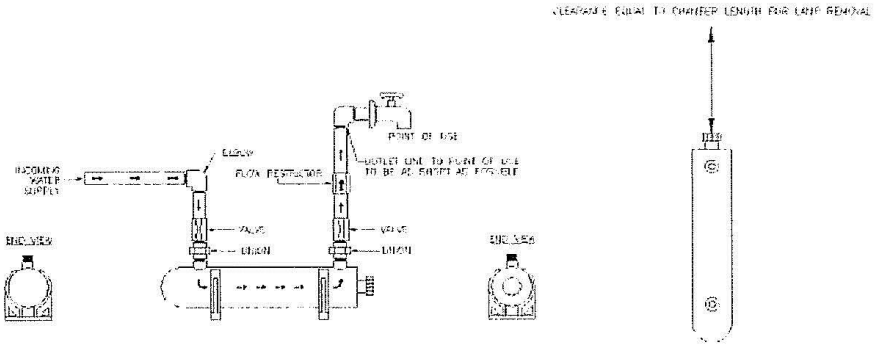
Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A R Prather	Date 7.18.16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/15/16
Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16
Maintenance Review			
Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards/manufacturer recommendations		N/A for regulatory driven PM ☐	
Comments:			
Maintenance Reviewer	Print Robert Belcher	Signature Robert Belcher	Date 7/25/16

FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

Implementation and Closure			
PM Coordinator • Asset Suite updated	Print Kim Hall	Signature Kim Hall	Date 9-2-16

Typical Installation



Installation Instructions

1. Install sterilizer equipment in a readily accessible and well lit location to facilitate inspection and maintenance.
2. Inspect for hidden electrical wiring or plumbing prior to drilling holes.
3. Attach mounting clips to the wall.
4. Insert chamber through mounting clips.
5. Connect to plumbing.
6. Install quartz sleeve and lamp.

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

a) Remove the retainer nut.

b) Slide the quartz sleeve into the chamber - closed end first.

c) Slide the O-ring over the open end of the quartz sleeve.

d) Tighten the retainer nut, hand tight.

e) Slide the lamp into the quartz sleeve.

f) Connect the lamp to the plug in transformer.

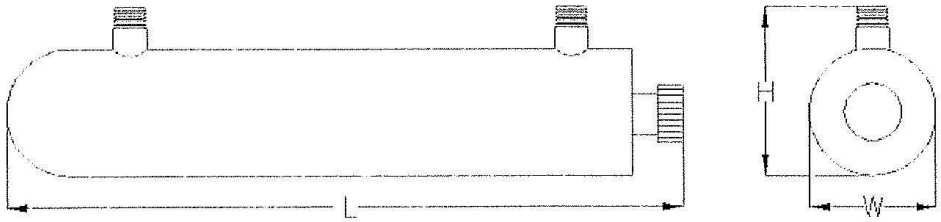
g) Cover the lamp connection with the vinyl cap.

7. Turn on the water and inspect for leaks. Repair if necessary.
8. a) For 110 VAC Units – Plug the transformer into an electrical outlet. An electrical outlet protected by a Ground Fault Circuit Interrupt (GFCI) circuit is recommended.

   b) For 220 VAC Units – Obtain the appropriate plug for your type of receptacle and attach it to the end of the power cord and plug it in.

2

Specifications



PRODUCT CODE	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING (LBS.)
PWUV2110	2	½" MNPT	18" x 6" x 5⅜"	110-130 v / 50-60 Hz	6
PWUV2220	2	½" MNPT	18" x 6" x 5⅜"	200-250 v / 50-60 Hz	6
PWUV6110	6	¾" MNPT	25½" x 6" x 5⅜"	110-130 v / 50-60 Hz	7
PWUV6220	6	¾" MNPT	25½" x 6" x 5⅜"	200-250 v / 50-60 Hz	7
PWUV8110	8	¾" MNPT	32" x 8¼" x 3¾"	110-130 v / 50-60 Hz	9
PWUV8220	8	¾" MNPT	32" x 8¼" x 3¾"	200-250 v / 50-60 Hz	9
PWUV12110	12	1" MNPT	41½" x 8¼" x 3¾"	110-130 v / 50-60 Hz	17
PWUV12220	12	1" MNPT	41½" x 8¼" x 3¾"	200-250 v / 50-60 Hz	17

Notes: Line cord and lamp lead wire omitted for clarity.

Replacing UV Lamp and Servicing UV System

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

Step 1 Disconnect power.

Step 2 Turn water off and open valve downstream of system to relieve pressure.

Step 3 Remove vinyl cap and unscrew the nut.

Step 4 Carefully withdraw lamp approximately 2 inches from chamber.

Step 5 While holding lamp end carefully remove lamp socket on end now exposed.

Step 6 Carefully withdraw lamp from chamber.

Step 7 Carefully remove O-ring from the end of quartz sleeve.

Step 8 Carefully remove quartz sleeve.

Step 9 To reinstall follow Steps 8 through 1 in reverse.

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

Maintenance Suggestion

To operate the sterilizer properly and attain its maximum efficiency, the following maintenance is recommended:

1. Quartz sleeve cleaning or replacement:
   a) Quartz sleeve is to be cleaned every 6-12 months, clean with glass cleaner.
   b) Quartz sleeve is to be replaced every 24 months.
2. UV lamp replacement is recommended every 8000-9000 hours of operation (approx. 12 months of continuous service).

CAUTION: Ultraviolet lamp and quartz sleeve are easily damaged. Pay attention when removing or replacing lamp and quartz sleeve.

Operating Conditions

Maximum Operating Pressure: 125psi (8.9 bar)

Maximum Operating Temperature: 104°F (40°C)

Minimum Operating Temperature: 36°F (2°C)

UV Dose At End Of Lamp Life (1 year or 9,000 Hours): 30mj/cm²

Maximum Iron: Less Than .3 PPM

Maximum Manganese: Less Than .05 PPM

Maximum Turbidity: Less Than 5 NTU

Maximum Hydrogen Sulfide: Less Than .05 PPM

Maximum Hardness: Less Than 7 Grains Per Gallon as $CaCO_3$

3

PMID 10217

FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

PM Justification/Change Tracking Number: AR # 1166					
Initiated by: A. R. Prather	63363	7/14/16	Phone 3-7473		
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM

Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)				
Building B21-631	MEL System 2210	MEL Equipment ID(s) PWA-UV-1 thru -7	Equipment Name Administration building potable water disinfection system UV lights	Critical Equipment ☐ Yes ☒ No

Asset Suite Data (if known)			
Model Work Order 236625	Frequency 12 month	Critical PM ☐ Yes ☒ No	Grace Period ±25

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Replace lights every 12 months (see attached maintenance sheet for lamp replacement).

- PWA-UV-1, -2, -5, -6 and -7: UV model # PWUV2110 (lights PWUVBULB2)
- PWA-UV-3 and -4: UV model # PWUV6110 (lights PWUVBULB6)

NOTE: lamps and sleeves are damaged easily; ensure careful handling.

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Manufacturer recommendation

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A R Prather	Date 7-18-16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/18/16
Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16
Maintenance Review			
Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards/manufacturer recommendations		N/A for regulatory driven PM ☐	
Comments:			

FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

Maintenance Reviewer	Print Robert Belcher	Signature Robert Belcher	Date 7/25/16
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print Kim Hall	Signature Kim Hall	Date 9-2-16

ES-WQ-PWUV

For Residential and Light Commercial Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

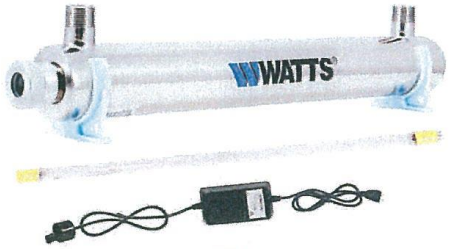
Series PWUV

PURE WATER

Watts UV Disinfection Systems

Pipe Sizes: ½" – 1" (15 – 25mm)
Flow Rate: Up to 12 gpm (45 lpm)

Watts PWUV systems are manufactured from 304 stainless steel and have an audible and visual lamp failure alarm. They are durable and well constructed, yet economically priced.



PWUV

Features

- Disinfection without chemicals
- Effective disinfection for chlorine resistant bacteria, virus and cysts
- Lamps rated for 12-month continuous service life
- Highly polished 304 stainless steel reactor chamber
- Audible and visual alarm indicating lamp failure
- Easy lamp replacement
- Available in 110v and 220V
- 30 mj/cm2 dose at specified flow rate at the end of lamp life

Applications

- Well water
- Homes
- Water systems
- Aquaculture
- Food service
- Water coolers
- RO systems

Note: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

WATTS®

Specifications

Chamber materials	304SS
Max. water temperature	104°F (40°C)
Min. water temperature	36°F (2°C)
Max pressure	125psi
UV dose (end of life)	30 mj/cm2
Lamp life	9,000 hrs
Lamps per chamber	Single

Water Quality Guidelines

Total Iron	less than 0.3 mg/l
Hydrogen sulfide	less than 0.05 mg/l
Turbidity	less than 1.0 NTU
Manganese	less than 0.05 mg/l
Hardness	less than 7 grains
UV transmittance	greater than 90%

Note: Minimum water quality guidelines are recommended to ensure proper operation and continuous disinfection.

Models

MODEL NO.	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING WEIGHT lbs.	SHIPPING WEIGHT kgs.
PWUV2110	2	1/2" MNPT	18" x 6" x 5-3/8"	110-130 v / 50-60 Hz	6	3
PWUV2220	2	1/2" MNPT	18" x 6" x 5-3/8"	200-250 v / 50-60 Hz	6	3
PWUV6110	6	3/4" MNPT	25-1/2" x 6" x 5-3/8"	110-130 v / 50-60 Hz	7	3
PWUV6220	6	3/4" MNPT	25-1/2" x 6" x 5-3/8"	200-250 v / 50-60 Hz	7	3
PWUV8110	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	9	4
PWUV8220	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	200-250 v / 50-60 Hz	9	4
PWUV12110	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	17	8
PWUV12220	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4"	200-250 v / 50-60 Hz	17	8

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

WATTS®

A Watts Water Technologies Company

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Canada: Tel. (888) 208-8927 • www.watts.ca

ES-WQ-PWUV

For Residential and Light Commercial Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

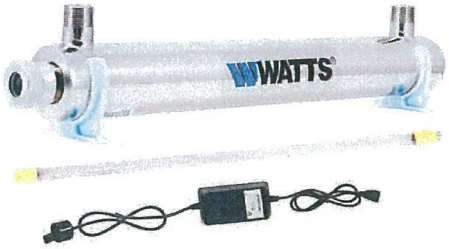
Series PWUV

PURE WATER

Watts UV Disinfection Systems

Pipe Sizes: ½" – 1" (15 – 25mm)
Flow Rate: Up to 12 gpm (45 lpm)

Watts PWUV systems are manufactured from 304 stainless steel and have an audible and visual lamp failure alarm. They are durable and well constructed, yet economically priced.



PWUV

Features

- Disinfection without chemicals
- Effective disinfection for chlorine resistant bacteria, virus and cysts
- Lamps rated for 12-month continuous service life
- Highly polished 304 stainless steel reactor chamber
- Audible and visual alarm indicating lamp failure
- Easy lamp replacement
- Available in 110v and 220V
- 30 mj/cm2 dose at specified flow rate at the end of lamp life

Applications

- Well water
- Homes
- Water systems
- Aquaculture
- Food service
- Water coolers
- RO systems

Note: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

WATTS®

Specifications

Chamber materials	304SS
Max. water temperature	104°F (40°C)
Min. water temperature	36°F (2°C)
Max pressure	125psi
UV dose (end of life)	30 mj/cm2
Lamp life	9,000 hrs
Lamps per chamber	Single

Water Quality Guidelines

Total Iron	less than 0.3 mg/l
Hydrogen sulfide	less than 0.05 mg/l
Turbidity	less than 1.0 NTU
Manganese	less than 0.05 mg/l
Hardness	less than 7 grains
UV transmittance	greater than 90%

Note: Minimum water quality guidelines are recommended to ensure proper operation and continuous disinfection.

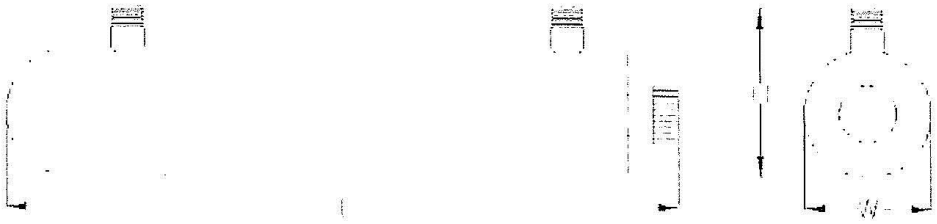
Models

MODEL NO.	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING WEIGHT lbs.	SHIPPING WEIGHT kgs.
PWUV2110	2	1/2" MNPT	18" x 6" x 5-3/8"	110-130 v / 50-60 Hz	6	3
PWUV2220	2	1/2" MNPT	18" x 6" x 5-3/8"	200-250 v / 50-60 Hz	6	3
PWUV6110	6	3/4" MNPT	25-1/2" x 6" x 5-3/8"	110-130 v / 50-60 Hz	7	3
PWUV6220	6	3/4" MNPT	25-1/2" x 6" x 5-3/8"	200-250 v / 50-60 Hz	7	3
PWUV8110	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	9	4
PWUV8220	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	200-250 v / 50-60 Hz	9	4
PWUV12110	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	17	8
PWUV12220	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4"	200-250 v / 50-60 Hz	17	8

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

Specifications



PRODUCT CODE	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING (LBS.)
PWUV2110	2	½" MNPT	18" x 6" x 5⅛"	110-130 v / 50-60 Hz	6
PWUV2220	2	½" MNPT	18" x 6" x 5⅛"	200-250 v / 50-60 Hz	6
PWUV6110	6	¾" MNPT	25¼" x 6" x 5⅛"	110-130 v / 50-60 Hz	7
PWUV6220	6	¾" MNPT	25¼" x 6" x 5⅛"	200-250 v / 50-60 Hz	7
PWUV8110	8	¾" MNPT	32" x 8¼" x 3¼"	110-130 v / 50-60 Hz	9
PWUV8220	8	¾" MNPT	32" x 8¼" x 3¼"	200-250 v / 50-60 Hz	9
PWUV12110	12	1" MNPT	41½" x 8¼" x 3¼"	110-130 v / 50-60 Hz	17
PWUV12220	12	1" MNPT	41½" x 8¼" x 3¼"	200-250 v / 50-60 Hz	17

Notes: Line cord and lamp lead wire omitted for clarity.

Replacing UV Lamp and Servicing UV System

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

Step 1 Disconnect power.

Step 2 Turn water off and open valve downstream of system to relieve pressure

Step 3 Remove vinyl cap and unscrew the nut.

Step 4 Carefully withdraw lamp approximately 2 inches from chamber.

Step 5 While holding lamp end carefully remove lamp socket on end now exposed

Step 6 Carefully withdraw lamp from chamber.

Step 7 Carefully remove O-ring from the end of quartz sleeve.

Step 8 Carefully remove quartz sleeve.

Step 9 To reinstall follow Steps 8 through 1 in reverse.

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

Maintenance Suggestion

To operate the sterilizer properly and attain its maximum efficiency, the following maintenance is recommended:

1. Quartz sleeve cleaning or replacement:
   a) Quartz sleeve is to be cleaned every 6-12 months, clean with glass cleaner.
   b) Quartz sleeve is to be replaced every 24 months.
2. UV lamp replacement is recommended every 8000-9000 hours of operation (approx. 12 months of continuous service).

CAUTION: Ultraviolet lamp and quartz sleeve are easily damaged. Pay attention when removing or replacing lamp and quartz sleeve.

Operating Conditions

Maximum Operating Pressure: 125psi (8.9 bar)

Maximum Operating Temperature: 104°F (40°C)

Minimum Operating Temperature: 36°F (2°C)

UV Dose At End Of Lamp Life (1 year or 9,000 Hours): 30mj/cm²

Maximum Iron: Less Than .3 PPM

Maximum Manganese: Less Than .05 PPM

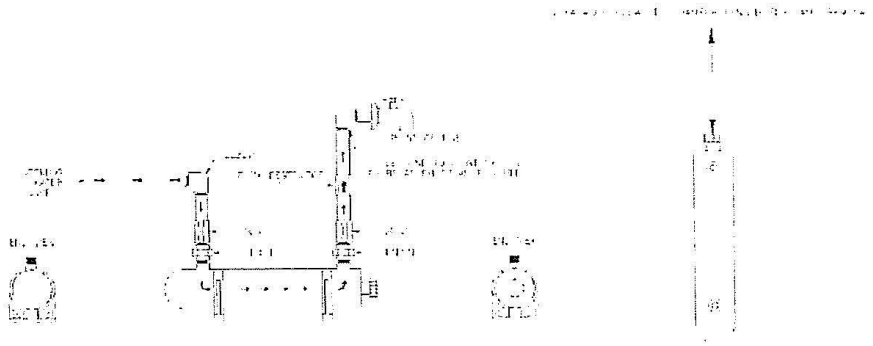
Maximum Turbidity: Less Than 5 NTU

Maximum Hydrogen Sulfide: Less Than .05 PPM

Maximum Hardness: Less Than 7 Grains Per Gallon as $CaCO_3$

3

Typical Installation



Installation Instructions

1. Install sterilizer equipment in a readily accessible and well lit location to facilitate inspection and maintenance.
2. Inspect for hidden electrical wiring or plumbing prior to drilling holes
3. Attach mounting clips to the wall.
4. Insert chamber through mounting clips.
5. Connect to plumbing
6. Install quartz sleeve and lamp.

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

a) Remove the retainer nut.

b) Slide the quartz sleeve into the chamber - closed end first

c) Slide the O-ring over the open end of the quartz sleeve.

d) Tighten the retainer nut, hand tight.

e) Slide the lamp into the quartz sleeve.

f) Connect the lamp to the plug in transformer.

g) Cover the lamp connection with the vinyl cap

7. Turn on the water and inspect for leaks. Repair if necessary
8. a) For 110 VAC Units – Plug the transformer into an electrical outlet. An electrical outlet protected by a Ground Fault Circuit Interrupt (GFCI) circuit is recommended

   b) For 220 VAC Units – Obtain the appropriate plug for your type of receptacle and attach it to the end of the power cord and plug it in

2

PMID 10217-01

FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

PM Justification/Change Tracking Number: AR# 11662					
Initiated by: A. R. Prather	63363	7/14/16	Phone 3-7473		
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM
Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)					
Building B21-631	MEL System 2210	MEL Equipment ID(s) PWA-UV-1 thru -7	Equipment Name Administration building potable water disinfection system UV lights	Critical Equipment ☐ Yes ☒ No	
Asset Suite Data (if known)					
Model Work Order 231621	Frequency 24 month	Critical PM ☐ Yes ☒ No	Grace Period ±25		

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Perform replacement of quarts sleeves in the potable water UV disinfection units every 24 months (see attached maintenance sheet for sleeve replacement).

- PWA-UV-1, -2, -5, -6 and -7: UV model # PWUV2110 (quartz tube PWUVQS2)
- PWA-UV-3 AND -4: UV model # PWUV6110 (quartz tube PWUVQS6)

NOTE: lamps and sleeves are damaged easily; ensure careful handling.

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Manufacturer recommendation

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A R Prather	Date 7-18-16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/18/16
Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16
Maintenance Review			
Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards/manufacturer recommendations		N/A for regulatory driven PM ☐	

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MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

Comments:			
Maintenance Reviewer	Print Robert Belcher	Signature Robert Belcher	Date 7/25/16
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print Kim Hall	Signature Kim Hall	Date 9-2-16

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MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

AR 1098

PM Justification/Change Tracking Number: PMID 10221					
Initiated by: A. R. Prather	63363	7/14/16	Phone 3-7473		
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM

Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)				
Building B21-630	MEL System 2212	MEL Equipment ID(s) PWM-BFP-1	Equipment Name Potable water backflow preventer in Maintenance Building	Critical Equipment ☒ Yes ☐ No

Asset Suite Data (if known)			
Model Work Order 236773	Frequency 12 M	Critical PM ☒ Yes ☐ No	Grace Period -30 +0 days

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Perform 12 month inspections and testing of backflow preventer per LI-370 using a qualified cross connection control technician.

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

State of Idaho IDAPA 58.01.08, section 552.06.c.

Company Requirement in LWP-8000, Section 4.10

Laboratory Instruction LI-370 requirements

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A. R. Prather	Date 7-18-16
System Engineering Manager	Print J. A. Krause	Signature J. A. Krause	Date 7/20/16

Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16

Maintenance Review			
Cost-Benefit (For New PM Only)		N/A for regulatory driven PM ☒	
Comments:			

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MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

Maintenance Reviewer	Print Robert Belcher	Signature Robert Belcher	Date 7/25/16
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print Kim Hall	Signature Kim Hall	Date KH 9-6-16 9-16-16

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MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

PM Justification/Change Tracking Number: 1169 PMID 10218					
Initiated by: A. R. Prather	63363	7/14/16	Phone 3-7473		
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM
Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)					
Building B21-630	MEL System 2210	MEL Equipment ID(s) PWM-FIL-1	Equipment Name Maintenance Building potable water disinfection system filters	Critical Equipment ☐ Yes ☒ No	
Asset Suite Data (if known)					
Model Work Order 336622	Frequency 6 month	Critical PM ☐ Yes ☒ No	Grace Period ±25		

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Replace filter cartridge every 6 months

- Pentek 3G standard series housing (Part # 150574)
- Pentek ECP5-10 filters (Part # 255482-43)

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Industry standard and best management practice for potable water systems

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A R Prather	Date 7.18.16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/19/16
Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16
Maintenance Review			
Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards		N/A for regulatory driven PM ☐	
Comments:			

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07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

Maintenance Reviewer	Print Robert Belcher	Signature R Belcher	Date 7/25/16
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print J GAFFNEY	Signature J Gaffney	Date 8/2/2016

PENTAIR

PENTEK 3G STANDARD SERIES FILTER HOUSINGS

VERSATILE DESIGN ACCEPTS MULTIPLE CARTRIDGE SIZES IN A VARIETY OF APPLICATION SETTINGS

*Shown with differential gauge. Gauges sold separately.

Pentair‡ Pentek‡ 3G Standard Series Housings feature integral brackets, 20" clear housings, and caps for differential pressure gauges. They accept standard double open end (DOE) and our O-ring sealing cartridges. The O-ring design offers enhanced cartridge sealing for critical cartridge applications.

3G Standard Filter Housings are manufactured from durable polypropylene or clear Styrene-Acrylonitrile (SAN). Reinforced polypropylene housings have excellent chemical resistance and are ideal for many residential, commercial and industrial applications. Clear sumps are manufactured from Styrene-Acrylonitrile (SAN). They offer on-site examination of the cartridge and have excellent chemical compatibility.

All are equipped with 3/4" NPT inlet and outlet ports. 3G Standard Filter Housings are available in 10" and 20" lengths and will accommodate a wide range of 2-1/4" to 3-1/8" diameter cartridges.

FEATURES/BENEFITS

- Integral bracket and mounting boss cap versions available
- Available in 10" and 20"sumps in clear and opaque
- Buttress threads and uniform walls for easier cartridge change and improved strength
- Accepts double O-ring sealing cartridges as well as standard DOE cartridges
- Optional pressure-relief/bleed button and differential pressure gauge
- Leak-proof seal

SPECIFICATIONS

- Housing – Polypropylene (opaque) or Styrene Acrylonitrile (clear)
- Cap – Reinforced Polypropylene
- Button Assembly – 300 Series stainless steel, EPDM, and polypropylene
- O-Ring – Buna-N
- Temperature Rating – 40-125°F (4.4-51.7°C)
- Maximum Pressure – 125 psi (8.6 bar)

Manufacture is unable to provide a clear housing with meter mount cap

MANT-103 F-1 FILTER HOUSING

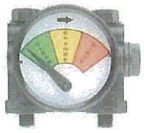
S AND PERFORMANCE

PART #	DESCRIPTION	MAXIMUM DIMENSIONS	INITIAL ΔP (PSI) @ FLOW RATE (GPM)
150542	3/4" #10 3G Standard Black/Blue Mounting Bracket Cap w/PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150546	3/4" #10 3G Standard Black/Blue Mounting Bracket Cap w/o PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150558	3/4" #10 3G Standard Blue/Clear Mounting Bracket Cap w/PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150587	3/4" #10 3G Standard Black/Clear Mounting Bracket Cap w/PR	12.75" x 5.38" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150550	3/4" #10 3G Standard Black/Blue Integral Bracket Cap w/PR	13.25" x 5.75" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150566	3/4" #10 3G Standard Blue/Clear Integral Bracket Cap w/PR	13.25" x 5.75" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150574	3/4" #10 3G Standard Black/Blue Integral Bracket Meter Mount Cap w/PR	13.25" x 5.75" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150544	3/4" #20 3G Standard Black/Blue Mounting Bracket Cap w/PR	23" x 5.38" (584 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150560	3/4" #20 3G Standard Blue/Clear Mounting Bracket Cap w/PR	23" x 5.38" (584 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150564	3/4" #20 3G Standard Blue/Clear Mounting Bracket Cap w/o PR	23" x 5.38" (584 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150552	3/4" #20 3G Standard Black/Blue Integral Bracket w/PR	23.50" x 5.75" (597 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)
150568	3/4" #20 3G Standard Blue/Clear Integral Bracket w/PR	23.50" x 5.75" (597 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)

CAUTION: Protect against freezing to prevent cracking of the filter and water leakage.

ACCESSORIES

PART #	DESCRIPTION
143549	3 Color Gauge for Meter Mount Cap
143550	2 Color Gauge for Meter Mount Cap
150295	SW-2 Wrench for Standard
155003	Cartridge Coupler for Standard Cartridges
151120	Buna-N #241 O-ring for Standard
151117	Viton #241 O-ring for Standard
151118	Silicone #241 O-ring for Standard
150578	MC-1A Kit - Zinc Plated Bracket for Standard
244043	MC-1A - Zinc Plated Bracket ONLY for Standard
244686	Two-Housing Standard System Bracket
244687	Three-Housing Standard Bracket



143549*

143550*

*Gauges sold separately.

PENTAIR

WATER QUALITY SYSTEMS
5730 NORTH GLEN PARK ROAD, MILWAUKEE, WI 53209
P: 262.238.4400 | F: 262.238.4404
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CUSTOMER CARE: 800.279.9404 | tech-support@pentair.com

310103 REV D MY15

PENTAIR

PENTEK ECP SERIES
PLEATED CELLULOSE POLYESTER CARTRIDGES

HIGHER WET STRENGTH THAN REGULAR CELLULOSE CARTRIDGES

Pentair‡ Pentek‡ ECP Series Cartridges are manufactured from a special formulation of resin-impregnated cellulose and polyester fibers.

This unique blend of materials provides a higher wet strength than regular cellulose cartridges. It also provides high flow rates and dirt-holding capacity while maintaining extremely low pressure drop.

The media is pleated around a polypropylene core for added strength. The pleated endcaps of the standard cartridges are immersed in a thermo-setting vinyl plastisol. The Big Blue cartridges have a molded endcap with gaskets. The pleated ends are sealed to the endcap with a thermoplastic adhesive. The overlap seam is sonically welded to reduce internal bypass, improving filtration efficiency.

ECP Series Cartridge endcaps feature a color-coding system for easy identification of micron ratings: tan (1 micron), white (5 micron), blue (20 micron), and yellow (50 micron).

ECP Series Cartridges contain more media surface area than most competitive cartridges. The Standard 10" ECP cartridge contains 6 ft² of media while most cartridges contain only 4.5 ft². Other available ECP cartridge sizes contain the following amount of media:

– Standard 10" cartridge: 6 ft²
– Standard 20" cartridge: 12 ft²
– BB 10" cartridge: 18 ft²
– BB 20" cartridge: 36 ft²

FEATURES/BENEFITS

- Replaces Pentek CP and HFCP Series Cartridges
- Special formulation of resin-impregnated cellulose and polyester fibers
- Provides higher wet strength than regular cellulose cartridges
- Minimal unloading and media migration
- Nominal 1, 5, 20, 50 micron rating
- Lengths: 10", 20"

SPECIFICATIONS

- Filter Media – Cellulose polyester
- Standard Endcaps – Vinyl plastisol
- Big Blue Endcaps – Polypropylene
- Core – Polypropylene
- Temperature Rating – 40-125°F (4.4-51.7°C)

SPECIFICATIONS AND PERFORMANCE

MODEL #	PART #	ENDCAP COLOR	MAXIMUM DIMENSIONS	RATING (NOMINAL)	INITIAL (PSI) @ FLOW RATE (GPM)
ECP1-10	255481-43	Tan	2.63" x 9.75" (67 mm x 248 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-10	255482-43	White	2.63" x 9.75" (67 mm x 248 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-10	255483-43	Blue	2.63" x 9.75" (67 mm x 248 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-10	255484-43	Yellow	2.63" x 9.75" (67 mm x 248 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-20	255485-43	Tan	2.63" x 20" (67 mm x 508 mm)	1 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP5-20	255486-43	White	2.63" x 20" (67 mm x 508 mm)	5 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP20-20	255487-43	Blue	2.63" x 20" (67 mm x 508 mm)	20 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP50-20	255488-43	Yellow	2.63" x 20" (67 mm x 508 mm)	50 micron	<1 psi @ 10 gpm (<0.1 bar @ 38 Lpm)
ECP1-BB	255489-43	Tan	4.5" x 9.75" (114 mm x 248 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-BB	255490-43	White	4.5" x 9.75" (114 mm x 248 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-BB	255491-43	Blue	4.5" x 9.75" (114 mm x 248 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-BB	255492-43	Yellow	4.5" x 9.75" (114 mm x 248 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP1-20BB	255493-43	Tan	4.5" x 20" (114 mm x 508 mm)	1 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP5-20BB	255494-43	White	4.5" x 20" (114 mm x 508 mm)	5 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP20-20BB	255495-43	Blue	4.5" x 20" (114 mm x 508 mm)	20 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)
ECP50-20BB	255496-43	Yellow	4.5" x 20" (114 mm x 508 mm)	50 micron	<1 psi @ 20 gpm (<0.1 bar @ 76 Lpm)

WARNING: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

PENTAIR

WATER QUALITY SYSTEMS
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MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

PM Justification/Change Tracking Number: AR# 11163 PMID 10219-03			
Initiated by: A. R. Prather	63363	7/14/16	Phone 3-7473

Change Type – Select all that apply

☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM

Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)

Building	MEL System	MEL Equipment ID(s)	Equipment Name	Critical Equipment
B21-630	2210	PWM-UV-1	Maintenance Building potable water disinfection system UV lights	☐ Yes ☒ No

Asset Suite Data (if known)

Model Work Order 236761	Frequency 6 month	Critical PM ☐ Yes ☒ No	Grace Period ±25

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Perform cleaning of quarts sleeve in the potable water UV disinfection units every 6 months (see attached maintenance documents for steps).

NOTE: lamps and sleeves are damaged easily; ensure careful handling. Clean with glass cleaner

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Manufacturer recommendation

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review

System Engineer	Print A. R. Prather	Signature A. R. Prather	Date 7.18.16
System Engineering Manager	Print J. A. Krause	Signature J. A. Krause	Date 7/19/16

Operations Review

Comments:

Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-25-16

Maintenance Review

Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards/manufacturer recommendations — N/A for regulatory driven PM ☐

Comments:

Maintenance Reviewer	Print Robert Bekker	Signature Robert Bekker	Date 7/25/16

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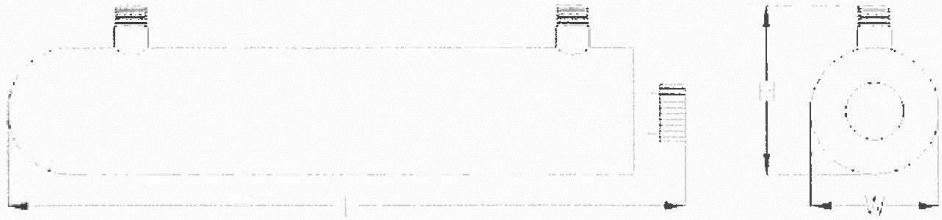
MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

Implementation and Closure

PM Coordinator • Asset Suite updated	Print J. GAFFNEY	Signature Julie Gaffney	Date 9/6/2016

Specifications



PRODUCT CODE	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING (LBS.)
PWUV2110	2	½" MNPT	18" x 6" x 5½"	110-130 v / 50-60 Hz	6
PWUV2220	2	½" MNPT	18" x 6" x 5½"	200-250 v / 50-60 Hz	6
PWUV6110	6	¾" MNPT	25½" x 6" x 5½"	110-130 v / 50-60 Hz	7
PWUV6220	6	¾" MNPT	25½" x 6" x 5½"	200-250 v / 50-60 Hz	7
PWUV8110	8	¾" MNPT	32" x 8¼" x 3¼"	110-130 v / 50-60 Hz	9
PWUV8220	8	¾" MNPT	32" x 8¼" x 3¼"	200-250 v / 50-60 Hz	9
PWUV12110	12	1" MNPT	41½" x 8¼" x 3¼"	110-130 v / 50-60 Hz	17
PWUV12220	12	1" MNPT	41½" x 8¼" x 3¼"	200-250 v / 50-60 Hz	17

Notes: Line cord and lamp lead wire omitted for clarity

Replacing UV Lamp and Servicing UV System

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

Step 1 Disconnect power.

Step 2 Turn water off and open valve downstream of system to relieve pressure.

Step 3 Remove vinyl cap and unscrew the nut.

Step 4 Carefully withdraw lamp approximately 2 inches from chamber.

Step 5 While holding lamp end carefully remove lamp socket on end now exposed

Step 6 Carefully withdraw lamp from chamber.

Step 7 Carefully remove O-ring from the end of quartz sleeve

Step 8 Carefully remove quartz sleeve.

Step 9 To reinstall follow Steps 8 through 1 in reverse

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

Maintenance Suggestion

To operate the sterilizer properly and attain its maximum efficiency, the following maintenance is recommended

1. Quartz sleeve cleaning or replacement:
   a) Quartz sleeve is to be cleaned every 6-12 months, clean with glass cleaner.
   b) Quartz sleeve is to be replaced every 24 months.
2. UV lamp replacement is recommended every 8000-9000 hours of operation (approx. 12 months of continuous service).

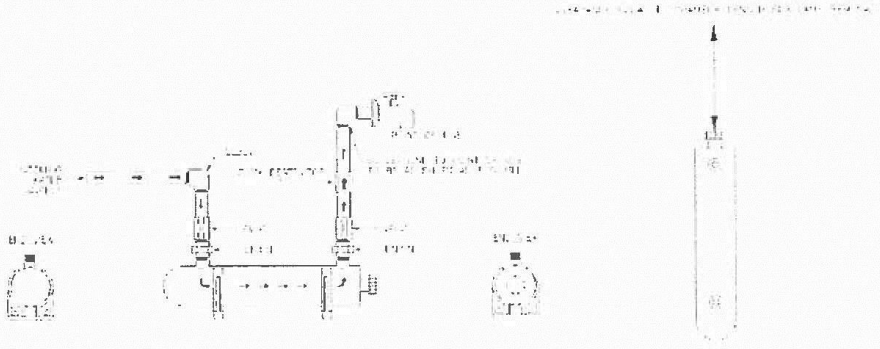
CAUTION: Ultraviolet lamp and quartz sleeve are easily damaged. Pay attention when removing or replacing lamp and quartz sleeve.

Operating Conditions

Maximum Operating Pressure: 125psi (8.9 bar)
Maximum Operating Temperature: 104°F (40°C)
Minimum Operating Temperature: 36°F (2°C)
UV Dose At End Of Lamp Life (1 year or 9,000 Hours): 30mj/cm²
Maximum Iron: Less Than .3 PPM
Maximum Manganese: Less Than .05 PPM
Maximum Turbidity: Less Than 5 NTU
Maximum Hydrogen Sulfide: Less Than .05 PPM
Maximum Hardness: Less Than 7 Grains Per Gallon as $CaCO_3$

3

Typical Installation



Installation Instructions

1. Install sterilizer equipment in a readily accessible and well lit location to facilitate inspection and maintenance.
2. Inspect for hidden electrical wiring or plumbing prior to drilling holes
3. Attach mounting clips to the wall.
4. Insert chamber through mounting clips.
5. Connect to plumbing
6. Install quartz sleeve and lamp.

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

a) Remove the retainer nut.

b) Slide the quartz sleeve into the chamber - closed end first.

c) Slide the O-ring over the open end of the quartz sleeve.

d)Tighten the retainer nut, hand tight.

e) Slide the lamp into the quartz sleeve.

f) Connect the lamp to the plug in transformer.

g) Cover the lamp connection with the vinyl cap.

7. Turn on the water and inspect for leaks. Repair if necessary.
8. a) For 110 VAC Units – Plug the transformer into an electrical outlet. An electrical outlet protected by a Ground Fault Circuit Interrupt (GFCI) circuit is recommended.

   b) For 220 VAC Units – Obtain the appropriate plug for your type of receptacle and attach it to the end of the power cord and plug it in.

2

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MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

PM Justification/Change Tracking Number: 1165 PM ID 10219					
Initiated by: A. R. Prather	63363	7/14/16			Phone 3-7473
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM
Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)					
Building B21-630	MEL System 2210	MEL Equipment ID(s) PWM-UV-1	Equipment Name Maintenance building potable water disinfection system UV lights	Critical Equipment ☐ Yes ☒ No	
Asset Suite Data (if known)					
Model Work Order 236624	Frequency 12 month	Critical PM ☐ Yes ☒ No	Grace Period ±25		

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-1201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Replace light every 12 months (see attached maintenance sheet for lamp replacement).

- UV model # PWUV2110 (lights PWUVBULB2)

NOTE: lamps and sleeves are damaged easily; ensure careful handling.

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Manufacturer recommendation

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A R Prather	Date 7-18-16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/19/16
Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16
Maintenance Review			
Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards/manufacturer recommendations		N/A for regulatory driven PM ☐	
Comments:			

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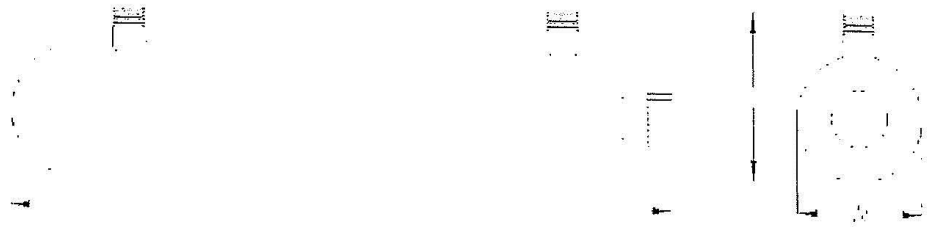
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

Maintenance Reviewer	Print Robert Belcher	Signature R K Belcher	Date 7/25/16
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print J. GAFFNEY	Signature J Gaffney	Date 9/2/2016

Specifications



PRODUCT CODE	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING (LBS.)
PWUV2110	2	½" MNPT	18" x 6" x 5⅓"	110-130 v / 50-60 Hz	6
PWUV2220	2	½" MNPT	18" x 6" x 5⅓"	200-250 v / 50-60 Hz	6
PWUV6110	6	¾" MNPT	25⅞" x 6" x 5⅓"	110-130 v / 50-60 Hz	7
PWUV6220	6	¾" MNPT	25⅞" x 6" x 5⅓"	200-250 v / 50-60 Hz	7
PWUV8110	8	¾" MNPT	32" x 8¼" x 3¼"	110-130 v / 50-60 Hz	9
PWUV8220	8	¾" MNPT	32" x 8¼" x 3¼"	200-250 v / 50-60 Hz	9
PWUV12110	12	1" MNPT	41⅞" x 8¼" x 3¼"	110-130 v / 50-60 Hz	17
PWUV12220	12	1" MNPT	41⅞" x 8¼" x 3¼"	200-250 v / 50-60 Hz	17

Notes: Line cord and lamp lead wire omitted for clarity

Replacing UV Lamp and Servicing UV System

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

Step 1 Disconnect power

Step 2 Turn water off and open valve downstream of system to relieve pressure

Step 3 Remove vinyl cap and unscrew the nut

Step 4 Carefully withdraw lamp approximately 2 inches from chamber

Step 5 While holding lamp end carefully remove lamp socket on end now exposed

Step 6 Carefully withdraw lamp from chamber

Step 7 Carefully remove O-ring from the end of quartz sleeve

Step 8 Carefully remove quartz sleeve

Step 9 To reinstall follow Steps 8 through 1 in reverse

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

Maintenance Suggestion

To operate the sterilizer properly and attain its maximum efficiency, the following maintenance is recommended

1 Quartz sleeve cleaning or replacement:

a) Quartz sleeve is to be cleaned every 6-12 months, clean with glass cleaner.

b) Quartz sleeve is to be replaced every 24 months

2 UV lamp replacement is recommended every 8000-9000 hours of operation (approx 12 months of continuous service)

CAUTION: Ultraviolet lamp and quartz sleeve are easily damaged. Pay attention when removing or replacing lamp and quartz sleeve.

Operating Conditions

Maximum Operating Pressure: 125psi (8.9 bar)

Maximum Operating Temperature: 104°F (40°C)

Minimum Operating Temperature: 36°F (2°C)

UV Dose At End Of Lamp Life (1 year or 9,000 Hours): 30mj/cm

Maximum Iron: Less Than .3 PPM

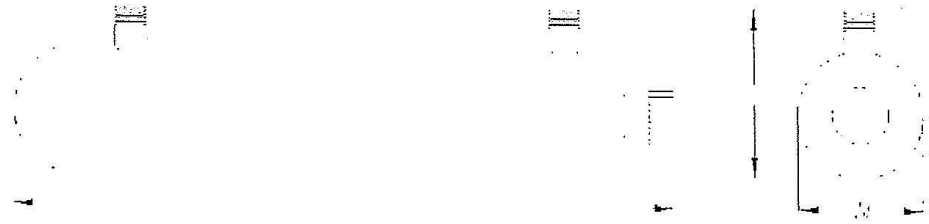
Maximum Manganese: Less Than .05 PPM

Maximum Turbidity: Less Than 5 NTU

Maximum Hydrogen Sulfide: Less Than .05 PPM

Maximum Hardness: Less Than 7 Grains Per Gallon as $CaCO_3$

Specifications



PRODUCT CODE	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING (LBS.)
PWUV2110	2	½" MNPT	18" x 6" x 5⅜"	110-130 v / 50-60 Hz	6
PWUV2220	2	½" MNPT	18" x 6" x 5⅜"	200-250 v / 50-60 Hz	6
PWUV6110	6	¾" MNPT	25⅞" x 6" x 5⅜"	110-130 v / 50-60 Hz	7
PWUV6220	6	¾" MNPT	25⅞" x 6" x 5⅜"	200-250 v / 50-60 Hz	7
PWUV8110	8	¾" MNPT	32" x 8 ¼" x 3¼"	110-130 v / 50-60 Hz	9
PWUV8220	8	¾" MNPT	32" x 8 ¼" x 3¼"	200-250 v / 50-60 Hz	9
PWUV12110	12	1" MNPT	41⅞" x 8 ¼" x 3¼"	110-130 v / 50-60 Hz	17
PWUV12220	12	1" MNPT	41⅞" x 8 ¼" x 3¼"	200-250 v / 50-60 Hz	17

Notes: Line cord and lamp lead wire omitted for clarity

Replacing UV Lamp and Servicing UV System

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

Step 1 Disconnect power

Step 2 Turn water off and open valve downstream of system to relieve pressure

Step 3 Remove vinyl cap and unscrew the nut

Step 4 Carefully withdraw lamp approximately 2 inches from chamber

Step 5 While holding lamp end carefully remove lamp socket on end now exposed

Step 6 Carefully withdraw lamp from chamber

Step 7 Carefully remove O-ring from the end of quartz sleeve

Step 8 Carefully remove quartz sleeve

Step 9 To reinstall follow Steps 8 through 1 in reverse

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

Maintenance Suggestion

To operate the sterilizer properly and attain its maximum efficiency the following maintenance is recommended

1 Quartz sleeve cleaning or replacement:

a) Quartz sleeve is to be cleaned every 6-12 months, clean with glass cleaner.

b) Quartz sleeve is to be replaced every 24 months

2 UV lamp replacement is recommended every 8000-9000 hours of operation (approx 12 months of continuous service)

CAUTION: Ultraviolet lamp and quartz sleeve are easily damaged. Pay attention when removing or replacing lamp and quartz sleeve.

Operating Conditions

Maximum Operating Pressure: 125psi (8 9 bar)

Maximum Operating Temperature: 104°F (40°C)

Minimum Operating Temperature: 36°F (2°C)

UV Dose At End Of Lamp Life (1 year or 9,000 Hours): 30mj/cm

Maximum Iron: Less Than .3 PPM

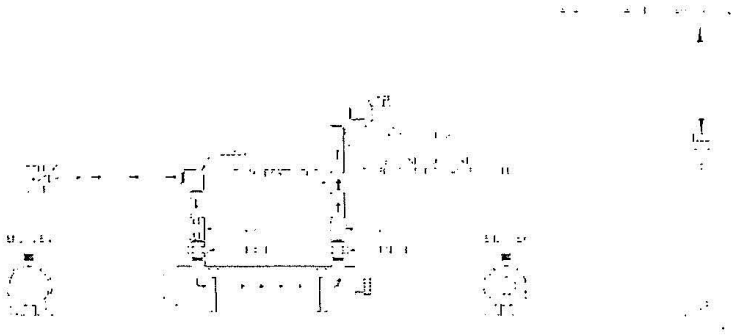
Maximum Manganese: Less Than .05 PPM

Maximum Turbidity: Less Than 5 NTU

Maximum Hydrogen Sulfide: Less Than .05 PPM

Maximum Hardness: Less Than 7 Grains Per Gallon as $CaCO_3$

Typical Installation



Installation Instructions

1 Install sterilizer equipment in a readily accessible and well lit location to facilitate inspection and maintenance

2 Inspect for hidden electrical wiring or plumbing prior to drilling holes

3 Attach mounting clips to the wall

4 Insert chamber through mounting clips

5 Connect to plumbing

6 Install quartz sleeve and lamp

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

a) Remove the retainer nut

b) Slide the quartz sleeve into the chamber - closed end first

c) Slide the O-ring over the open end of the quartz sleeve

d) Tighten the retainer nut, hand tight

e) Slide the lamp into the quartz sleeve

f) Connect the lamp to the plug in transformer

g) Cover the lamp connection with the vinyl cap

7 Turn on the water and inspect for leaks. Repair if necessary

8 a) For 110 VAC Units – Plug the transformer into an electrical outlet. An electrical outlet protected by a Ground Fault Circuit Interrupt (GFCI) circuit is recommended

b) For 220 VAC Units – Obtain the appropriate plug for your type of receptacle and attach it to the end of the power cord and plug it in

2

FERGUSON ENTERPRISES, INC.

MANT103		MANT-103 UV-1 UTRA VIOLENT DISINFECTION SYSTEM
WPWUV2110	WATTS	LFN PWRO4401 WHOLE HOUSE RO 2
WPWUVBULB2	WATTS	PWUV8220 ULTRAVIOLET SYS
WPWUVBAL2	WATTS	PWUVBULB6 UV REPLACEMENT
WPWUVQS2	WATTS	LFN PWUVBULB12 UV REPLACE BUL

MANT-103 UV-1 UTRA VIOLENT DISINFECTION SYSTEM

ES-WQ-PWUV

For Residential and Light Commercial Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

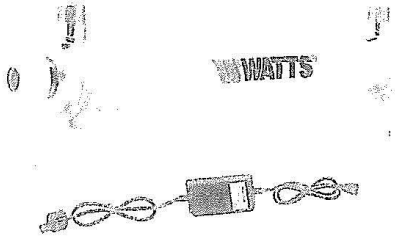
Series PWUV

Watts UV Disinfection Systems

Pipe Sizes: ½" - 1" (15 - 25mm)
Flow Rate: Up to 12 gpm (45 lpm)

Watts PWUV systems are manufactured from 304 stainless steel and have an audible and visual lamp failure alarm. They are durable and well constructed, yet economically priced.

PURE WATER



PWUV

Features

- Disinfection without chemicals
- Effective disinfection for chlorine resistant bacteria, virus and cysts
- Lamps rated for 12-month continuous service life
- Highly polished 304 stainless steel reactor chamber
- Audible and visual alarm indicating lamp failure
- Easy lamp replacement
- Available in 110v and 220V
- 30 mj/cm2 dose at specified flow rate at the end of lamp life

Applications

- Well water
- Homes
- Water systems
- Aquaculture
- Food service
- Water coolers
- RO systems

Note: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

WATTS®

Specifications

Chamber materials	304SS
Max. water temperature	104°F (40°C)
Min. water temperature	35°F (2°C)
Max pressure	125psi
UV dose (end of life)	30 mj/cm2
Lamp life	9,000 hrs
Lamps per chamber	Single

Water Quality Guidelines

Total Iron	less than 0.3 mg/l
Hydrogen sulfide	less than 0.05 mg/l
Turbidity	less than 1.0 NTU
Manganese	less than 0.05 mg/l
Hardness	less than 7 grains
UV transmittance	greater than 90%

Note: Minimum water quality guidelines are recommended to ensure proper operation and continuous disinfection.

Models

MODEL NO.	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING WEIGHT lbs.	kgs.
PWUV2110	2	1/2" MNPT	18" x 6" x 5-3/8"	110-130 v / 50-60 Hz	6	3
PWUV2220	2	1/2" MNPT	18" x 6" x 5-3/8"	200-250 v / 50-60 Hz	6	3
PWUV6110	6	3/4" MNPT	25-1/2" x 6" x 5-3/8"	110-130 v / 50-60 Hz	7	3
PWUV6220	6	3/4" MNPT	25-1/2" x 6" x 5-3/8"	200-250 v / 50-60 Hz	7	3
PWUV8110	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	9	4
PWUV8220	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	200-250 v / 50-60 Hz	9	4
PWUV12110	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	17	8
PWUV12220	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4"	200-250 v / 50-60 Hz	17	8

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

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A Watts Water Technologies Company

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Canada: Tel (888) 208-8927 • www.watts.ca

ES-WQ-PWUV 1225

FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

PM Justification/Change Tracking Number: AR 1173 PMiD 10219-02					
Initiated by: A. R. Prather	63363	7/14/16			Phone 3-7473
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☒ New PM	☐ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM

Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)				
Building B21-630 236759	MEL System 2210	MEL Equipment ID(s) PWM-UV-1	Equipment Name Maintenance Building potable water disinfection system UV lights	Critical Equipment ☐ Yes ☒ No

Asset Suite Data (if known)			
Model Work Order	Frequency 24 month	Critical PM ☐ Yes ☒ No	Grace Period ±25

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

Perform replacement of quartz sleeve in the potable water UV disinfection units every 24 months (see attached maintenance sheet for sleeve replacement).

- UV model # PWUV2110 (quartz sleeve PWUVQS2)

NOTE: lamps and sleeves are damaged easily; ensure careful handling.

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

Manufacturer recommendation

Proposed Start Date and Justification:

Based on completion of construction and activation of component

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A R Prather	Date 7.18.16
System Engineering Manager	Print J. A. Krause	Signature J A Krause	Date 7/19/16
Operations Review			
Comments:			
Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 7-20-16
Maintenance Review			
Cost-Benefit (For New PM Only) Potable water systems should be maintained per industry standards/manufacturer recommendations		N/A for regulatory driven PM ☐	
Comments:			

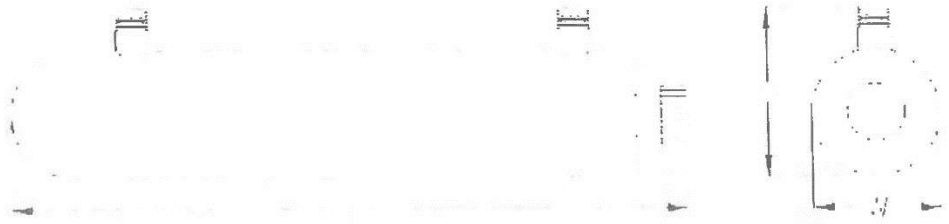
FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control

(SP-20.2.5)

Maintenance Reviewer	Print Robert Belcher	Signature Robert Belcher	Date 7/25/16
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print J. CAFFNEY	Signature Julie Caffney	Date 9/6/16

Specifications



PRODUCT CODE	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS (L X W X H)	ELECTRICAL	SHIPPING (LBS.)
PWUV2110	2	½" MNPT	18" x 6" x 5⅛"	110-130 v / 50-60 Hz	6
PWUV2220	2	½" MNPT	18" x 6" x 5⅛"	200-250 v / 50-60 Hz	6
PWUV6110	6	¾" MNPT	25¼" x 6" x 5⅛"	110-130 v / 50-60 Hz	7
PWUV6220	6	¾" MNPT	25¼" x 6" x 5⅛"	200-250 v / 50-60 Hz	7
PWUV8110	8	¾" MNPT	32" x 8⅛" x 3¼"	110-130 v / 50-60 Hz	9
PWUV8220	8	¾" MNPT	32" x 8⅛" x 3¼"	200-250 v / 50-60 Hz	9
PWUV12110	12	1" MNPT	41⅛" x 8¼" x 3¼"	110-130 v / 50-60 Hz	17
PWUV12220	12	1" MNPT	41⅛" x 8¼" x 3¼"	200-250 v / 50-60 Hz	17

Notes: Line cord and lamp lead wire omitted for clarity

Replacing UV Lamp and Servicing UV System

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

Step 1 Disconnect power.

Step 2 Turn water off and open valve downstream of system to relieve pressure.

Step 3 Remove vinyl cap and unscrew the nut.

Step 4 Carefully withdraw lamp approximately 2 inches from chamber.

Step 5 While holding lamp end carefully remove lamp socket on end now exposed

Step 6 Carefully withdraw lamp from chamber.

Step 7 Carefully remove O-ring from the end of quartz sleeve

Step 8 Carefully remove quartz sleeve.

Step 9 To reinstall follow Steps 8 through 1 in reverse

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6-12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

Maintenance Suggestion

To operate the sterilizer properly and attain its maximum efficiency, the following maintenance is recommended:

1. Quartz sleeve cleaning or replacement:
   a) Quartz sleeve is to be cleaned every 6-12 months, clean with glass cleaner.
   b) Quartz sleeve is to be replaced every 24 months.
2. UV lamp replacement is recommended every 8000-9000 hours of operation (approx. 12 months of continuous service).

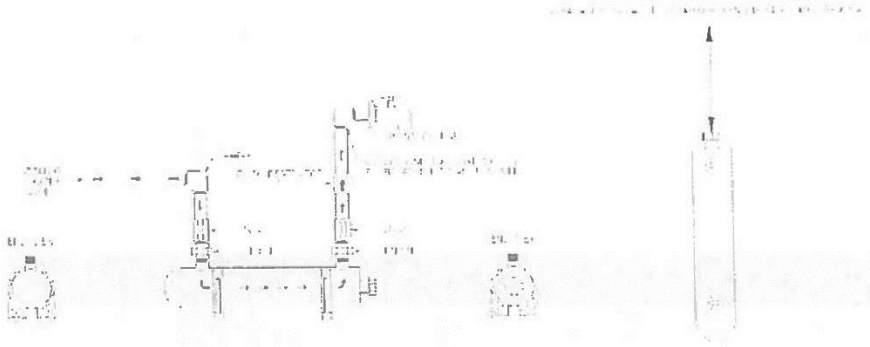
CAUTION: Ultraviolet lamp and quartz sleeve are easily damaged. Pay attention when removing or replacing lamp and quartz sleeve.

Operating Conditions

Maximum Operating Pressure: 125psi (8.9 bar)
Maximum Operating Temperature: 104°F (40°C)
Minimum Operating Temperature: 36°F (2°C)
UV Dose At End Of Lamp Life (1 year or 9,000 Hours) 30mj/cm²
Maximum Iron: Less Than .3 PPM
Maximum Manganese: Less Than .05 PPM
Maximum Turbidity: Less Than 5 NTU
Maximum Hydrogen Sulfide: Less Than .05 PPM
Maximum Hardness: Less Than 7 Grains Per Gallon as $CaCO_3$

3

Typical Installation



Installation Instructions

1. Install sterilizer equipment in a readily accessible and well lit location to facilitate inspection and maintenance.
2. Inspect for hidden electrical wiring or plumbing prior to drilling holes
3. Attach mounting clips to the wall
4. Insert chamber through mounting clips
5. Connect to plumbing
6. Install quartz sleeve and lamp

Note: Avoid touching the sides of the quartz sleeve and lamp, handle by the ends only.

a) Remove the retainer nut.

b) Slide the quartz sleeve into the chamber - closed end first

c) Slide the O-ring over the open end of the quartz sleeve.

d) Tighten the retainer nut, hand tight.

e) Slide the lamp into the quartz sleeve

f) Connect the lamp to the plug in transformer.

g) Cover the lamp connection with the vinyl cap.

7. Turn on the water and inspect for leaks. Repair if necessary.
8. a) For 110 VAC Units – Plug the transformer into an electrical outlet. An electrical outlet protected by a Ground Fault Circuit Interrupt (GFCI) circuit is recommended

   b) For 220 VAC Units – Obtain the appropriate plug for your type of receptacle and attach it to the end of the power cord and plug it in.

2

FERGUSON ENTERPRISES, INC.

MANT103		MANT-103 UV-1 UTRA VIOLENT DISINFECTION SYSTEM
WPWUV2110	WATTS	LFN PWRO4401 WHOLE HOUSE RO 2
WPWUVBULB2	WATTS	PWUV8220 ULTRAVIOLET SYS
WPWUVBAL2	WATTS	PWUVBULB6 UV REPLACEMENT
WPWUVQS2	WATTS	LFN PWUVBULB12 UV REPLACE BUL

MANT-103 UV-1 UTRA VIOLENT DISINFECTION SYSTEM

ES-WQ-PWUV

For Residential and Light Commercial Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

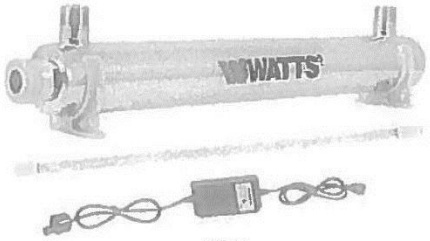
Series PWUV

PURE WATER

Watts UV Disinfection Systems

Pipe Sizes: ½" – 1" (15 – 25mm)
Flow Rate: Up to 12 gpm (45 lpm)

Watts PWUV systems are manufactured from 304 stainless steel and have an audible and visual lamp failure alarm. They are durable and well constructed, yet economically priced.



PWUV

Features

- Disinfection without chemicals
- Effective disinfection for chlorine resistant bacteria, virus and cysts
- Lamps rated for 12-month continuous service life
- Highly polished 304 stainless steel reactor chamber
- Audible and visual alarm indicating lamp failure
- Easy lamp replacement
- Available in 110v and 220V
- 30 mj/cm2 dose at specified flow rate at the end of lamp life

Applications

- Well water
- Homes
- Water systems
- Aquaculture
- Food service
- Water coolers
- RO systems

Note: Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

WATTS®

MANT-103 UV-1 UTRA VIOLENT DISINFECTION SYSTEM

Specifications

Chamber materials	304SS
Max. water temperature	104°F (40°C)
Min. water temperature	36°F (2°C)
Max pressure	125psi
UV dose (end of life)	30 mj/cm2
Lamp life	9,000 hrs
Lamps per chamber	Single

Water Quality Guidelines

Total iron	less than 0.3 mg/l
Hydrogen sulfide	less than 0.05 mg/l
Turbidity	less than 1.0 NTU
Manganese	less than 0.05 mg/l
Hardness	less than 7 grains
UV transmittance	greater than 90%

Note: Minimum water quality guidelines are recommended to ensure proper operation and continuous disinfection.

Models

MODEL NO.	FLOW RATE (GPM)	PIPE SIZE	DIMENSIONS D X W X H	ELECTRICAL	SHIPPING WEIGHT Apx.	Apx.
PWUV2110	2	1/2" MNPT	18" x 6" x 5-3/8"	110-130 v / 50-60 Hz	6	3
PWUV2220	2	1/2" MNPT	18" x 6" x 5-3/8"	200-250 v / 50-60 Hz	6	3
PWUV6110	6	3/4" MNPT	25-1/2" x 6" x 5-3/8'	110-130 v / 50-60 Hz	7	3
PWUV6220	6	3/4" MNPT	25-1/2" x 6" x 5-3/8'	200-250 v / 50-60 Hz	7	3
PWUV8110	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	9	4
PWUV8220	8	3/4" MNPT	32" x 8-1/4" x 3-3/4"	200-250 v / 50-60 Hz	9	4
PWUV12110	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4"	110-130 v / 50-60 Hz	17	8
PWUV12220	12	1" MNPT	41-1/2" x 8-1/4" x 3-3/4	200-250 v / 50-60 Hz	17	8

Replacement Parts

FLOW RATE (GPM)	BULB MODEL	BALLAST MODEL	QUARTZ SLEEVE MODEL
2	PWUVBULB2	PWUVBAL2	PWUVQS2
6	PWUVBULB6	PWUVBAL6-12	PWUVQS6
8	PWUVBULB8	PWUVBAL6 12	PWUVQS8
12	PWUVBULB12	PWUVBAL6-12	PWUVQS12

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ES-WQ-PWUV 1225

Appendix E

Equipment Vendor Instructions

431.13
06/21/2006
Rev. 05

VENDOR DATA
TRANSMITTAL & DISPOSITION FORM

31055-503528-158.1 — To be completed by Supplier/Subcontractor

Purchase Order or Subcontract Number: 00121414 — Project Title/Number: RHLLW:1858 Administration Building Spec / 31055

Submittal Number: CH-Adm-163 — Supplier/Subcontractor Name: AREVA Federal Services

Submittal Date: 05/17/2016 — Address: 2070 West Broadway, Idaho Falls ID, 83402

VDS Item No.	VDT Item No.	Specification/ Drawing Reference	Tag Number	Submittal Status	Revision Level	Supplier/ Subcontractor Document Number (if applicable)	Description	VDR Number	Disp Code
158	01	1858-223200	NA	IO	0	CH-Adm-163	Product Data Compliance for Filter Housing & UV Disinfection	545899	D

Remarks

Julethia Hawthorn — Digitally signed by HAWTHORN Julethia
Date: 2016.05.17 09:32:28 -04'00'

Supplier/Subcontractor Authorized Signature / Date

To Be Completed by Contractor/AE

Cindy Dabb — 05/18/2016

Authorized Signature / Date

Vendor Data Review System Final Disposition Screen

This vendor data item has been given the following disposition codes

Reviewer	Revision Level	Date	Disposition Code	Comments
RICHARDS, STEVEN C	0	17-MAY-16	D	
STACEY, MARCELA C	0	18-MAY-16	D	
AUSTAD, STEPHANIE L	0	17-MAY-16	D	

Final Disposition: D

VDR Number:	VDR-545899
Revision Level:	0
Project Number:	31055 - 503528
Transmittal Number:	31055-503528-158.1
Transmittal Status:	Information Only
Line Item:	1
Review Remarks:	

Disposition Code::	By::	Final Comments::
D	Stacey, Marcela Cecilia	

AREVA

AREVA Federal Services LLC

DATA TRANSMITTAL FORM

Supplier:	C & H Construction Company, Inc.	**DTF No:**	CH ADM-163	Page 1 of 1	
P.O./SC No:	15C3011496			**Date:**	5/4/16
Type of Submittal:	☐ First	☒ Re-Submittal		**SDRL List item No:**	ADM-163
Submitted for:	☒ *Approval* ☐ *Review* ☐ *Information*		***Number of Copies Submitted*: 1**		
Submitted By:	Shelly Furukawa	[signature]		Document Control	
	(Name)	**(Signature)**		**(Title)**	

ITEM NUMBER	DOCUMENT NUMBER	REVISION NUMBER	DOCUMENT DESCRIPTION	AFS DISPOSITION
01	223200	N/A	Filter Housing and UV Disinfection Product Data Compliance	☒ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA

Comments: No Comments

Technical Reviewer (i.e., RE, PTL, SME, QA, etc.) [signature]

Date 5/16/2016

AFS DISPOSITION CODES AND DEFINITIONS

AP	Approved	Work may proceed.	Resubmittal is not required
AWC	Approved with Comment	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
REV	Reviewed	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
RWC	Reviewed with Comment	Work may proceed; **subject to incorporation and compliance w/ Buyer comments.**	**Correct and resubmit**
DS	Disapproved	**Work may not proceed.**	**Correct and resubmit**
RSA	Receipt Submittal Acknowledged	No other action required.	

If, in the judgment of the Supplier, the incorporation of AFS' comments will result in a change to the Purchase Order/Subcontract, work shall not proceed and the Supplier shall immediately provide a written notice to AFS' C&P Representative describing the change.

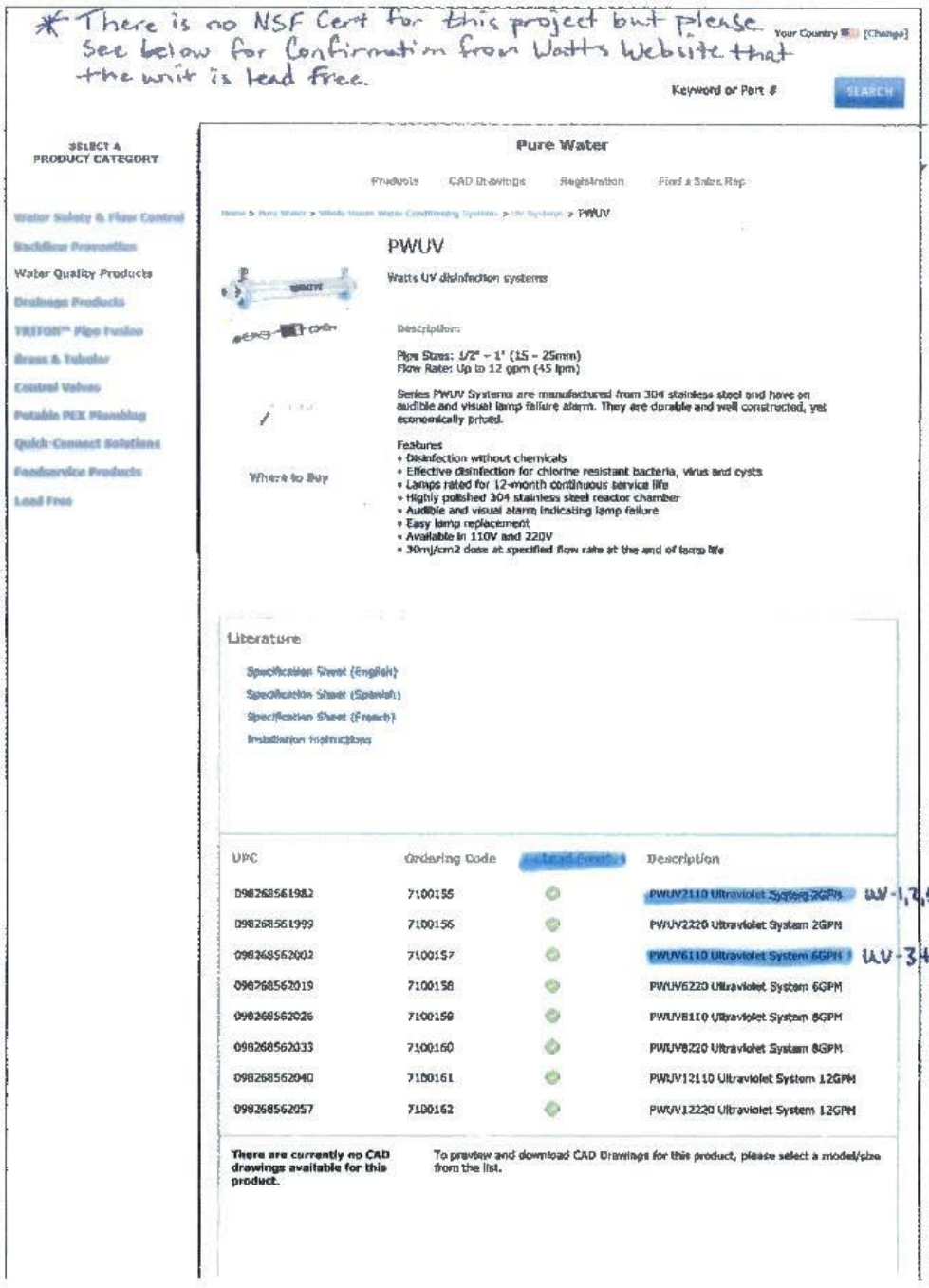
Project Manager (PM) / Engineering Manager (EM) or Designated Individual (DI) Approval

Digitally signed by BROUGHTON Ronnie
Date: 2016.05.16 12:50:14 -04'00'

Date:

AFS-EN-FRM-023 Rev 01 (Effective August 18, 2014)
Refer to AFS-EN-PRC-012

ADM-163



* There is no NSF Cert for this project but please see below for Confirmation from Watts Website that the unit is lead free.

Your Country [Change]

Keyword or Part # SEARCH

SELECT A PRODUCT CATEGORY

Water Safety & Flow Control
Backflow Prevention
Water Quality Products
Drainage Products
TRITON™ Pipe Fusion
Brass & Tubular
Control Valves
Potable PEX Plumbing
Quick Connect Solutions
Foodservice Products
Lead Free

Pure Water

Products CAD Drawings Registration Find a Sales Rep

Home > Pure Water > Whole House Water Conditioning Systems > UV Systems > PWUV

PWUV

Watts UV disinfection systems

Where to Buy

Description

Pipe Sizes: 1/2" - 1" (15 - 25mm)
Flow Rate: Up to 12 gpm (45 lpm)

Series PWUV Systems are manufactured from 304 stainless steel and have an audible and visual lamp failure alarm. They are durable and well constructed, yet economically priced.

Features
- Disinfection without chemicals
- Effective disinfection for chlorine resistant bacteria, virus and cysts
- Lamps rated for 12-month continuous service life
- Highly polished 304 stainless steel reactor chamber
- Audible and visual alarm indicating lamp failure
- Easy lamp replacement
- Available in 110V and 220V
- 30mj/cm2 dose at specified flow rate at the end of lamp life

Literature

Specification Sheet (English)
Specification Sheet (Spanish)
Specification Sheet (French)
Installation Instructions

UPC	Ordering Code	Lead Free	Description
098268561982	7100155		PWUV2110 Ultraviolet System 2GPM
098268561999	7100156		PWUV2220 Ultraviolet System 2GPM
098268562002	7100157		PWUV6110 Ultraviolet System 6GPM
098268562019	7100158		PWUV6220 Ultraviolet System 6GPM
098268562026	7100159		PWUV8110 Ultraviolet System 8GPM
098268562033	7100160		PWUV8220 Ultraviolet System 8GPM
098268562040	7100161		PWUV12110 Ultraviolet System 12GPM
098268562057	7100162		PWUV12220 Ultraviolet System 12GPM

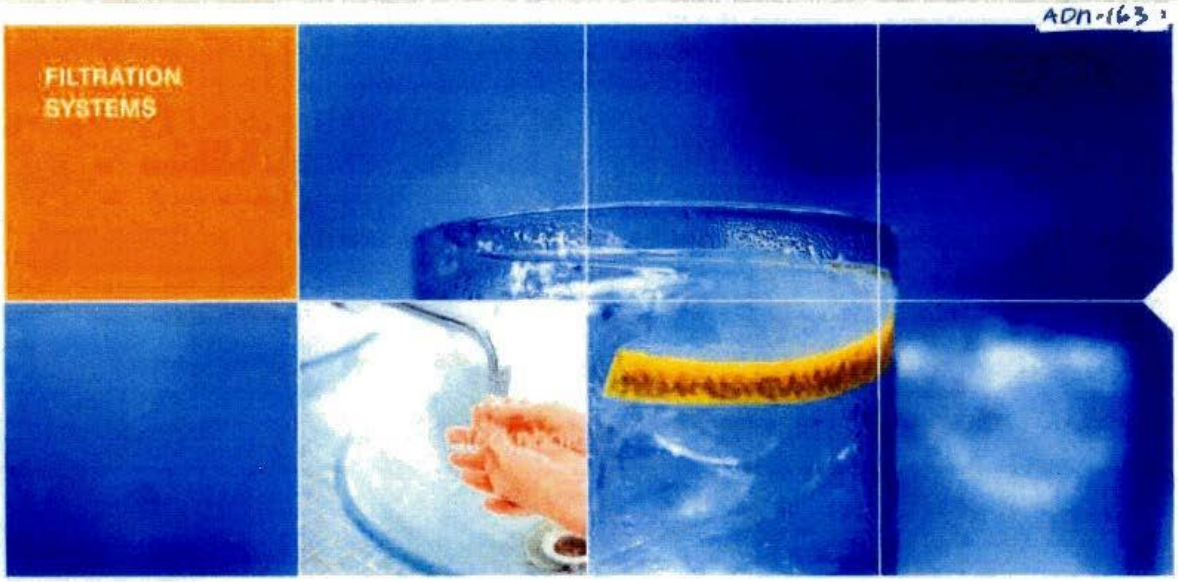
UV-1,2,5,6,7

UV-3,4,4

There are currently no CAD drawings available for this product.

To preview and download CAD Drawings for this product, please select a model/size from the list.

ADN-163



PENTEK® 3G Standard

Filter Housings

20" IB/MM Opaque with 143549 Meter

20" IB Clear

10" IB Clear

At Pentair we started from the ground up, utilizing our 35 years of experience, to create the unique and innovateve **3G** design. This design features integral brackets, 20" clear housings, and caps for differential pressure gauges. The **3G housings** accept standard double open end (DOE) cartridges.

3G Standard Filter Housings are manufactured from durable polypropylene or clear Styrene-Acrylonitrile (SAN). Reinforced polypropylene housings have excellent chemical resistance and are ideal for many residential, commercial and industrial application. Clear sumps are manufactured from SAN. They offer on-site examination of the cartidge and have excellent chemical compatibility.

All are equipped with 3/4" NPT inlet and outlet ports. **3G Standard Filter Housings** are available in 10" and 20" lengths and will accommodate a wide range of 2-1/4" to 3-1/8" diameter cartridges.

Product Features

- Integral bracket and mounting boss cap versions available
- Available in 10" and 20" sumps in clear and opaque
- Buttress threads and uniform walls for easier cartidge change and improved strength
- Accepts standard DOE cartidges
- Optional pressure-relief/bleed button and differential pressure gauge
- Leak-proof sealing with top-seated floating Buna-N o-ring

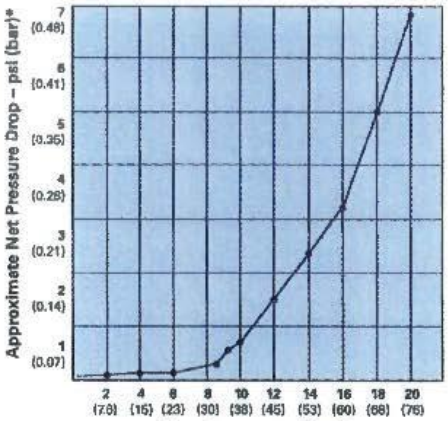
Pentair Water

FILTRATION SYSTEMS

PENTEK® 3G Standard

Filter Housings

* Shown with differential gauge. Gauges sold seperately.



*Pressure drop and flow rate based on housing without cartridge.

NSF COMPONENT — Filter Housings Tested and Certified by NSF International to NSF/ANSI Standard 42 for material and structural integrity requirements.

Housing Specifications and Performance Data

Model	Maximum Dimensions	Initial psi @ Flow Rate (gpm)	Max. Temp.	Max. Pressure
3G #10 Blue or Clear MB	12-3/4" x 5-3/8" (324 mm x 137 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)	125°F (51.7°C)	125 psi (8.62 bar)
3G #10 Blue or Clear IB	13-1/4" x 5-3/4" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)	125°F (51.7°C)	125 psi (8.62 bar)
3G #10 Blue IB/MM*	13-1/4" x 5-3/4" (337 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)	125°F (51.7°C)	125 psi (8.62 bar)
3G #20 Blue or Clear MB	23" x 5-3/8" (597 mm x 137mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)	125°F (51.7°C)	125 psi (8.62 bar)
3G #20 Blue or Clear IB	23-1/2" x 5-3/4" (597 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)	125°F (51.7°C)	125 psi (8.62 bar)
3G #20 Blue IB/MM*	23-1/2" x 5-3/4" (597 mm x 146 mm)	1 psi @ 10 gpm (0.07 bar @ 38 Lpm)	125°F (51.7°C)	125 psi (8.62 bar)

MB = Mounting bosses for MC-1A bracket IB = Integral Bracket MM = Meter Mount
*Height does not include meter. Add 1-1/4" for 143549 gauge and 1/2" for 143550 gauge.

** 143549

** 143550

** Gauges sold seperately.

Model	Accessories
150578	Mounting Bracket
150295	Wrench
143549	3-color gauge
143550	2-color gauge

Materials of Construction

Housing	Polypropylene (Opaque) or Styrene Acrylonitrile (Clear)
Cap	Reinforced Polypropylene
Button Assembly	300-series Stainless Steel, EPDM, and Polypropylene
O-Ring	#241 Buna-N (151120)

CAUTION: Protect against freezing to prevent cracking of the filter and water leakage.

Pentair Water

Pentair Residential Filtration, LLC
5730 North Glen Park Road
Milwaukee, WI 53209
Tel: 262.238.4400
Fax: 262.238.4404
www.pentairaqua.com/pro
Customer Care: 800.279.9404

310103 Rev A JE11

431.13
06/21/2006
Rev. 05

VENDOR DATA
TRANSMITTAL & DISPOSITION FORM

31055-503528-150.1 — To be completed by Supplier/Subcontractor

Purchase Order or Subcontract Number: 00121414 — Project Title/Number: RHLLW:SPC-1858 Admin Building Construction Spec / 31055

Submittal Number: CH-Adm-155 — Supplier/Subcontractor Name: AREVA Federal Services

Submittal Date: 09/07/16 — Address: 2070 West Broadway, Idaho Falls ID, 83402

VDS Item No.	VDT Item No.	Specification/ Drawing Reference	Tag Number	Submittal Status	Revision Level	Supplier/ Subcontractor Document Number (if applicable)	Description	VDR Number	Disp Code
150	01	1858-221123.13	NA	IO	0	CH-Adm-155	Product Data Compliance for Booster Pumps	562658	D

Remarks

Julethia Hawthorn — Digitally signed by HAWTHORN Julethia
Date: 2016.09.07 14:51:40 -04'00'

Supplier/Subcontractor Authorized Signature / Date

To Be Completed by Contractor/AE

Cindy Dabb — 09/19/2016

Authorized Signature / Date

Vendor Data Review System Final Disposition Screen

This vendor data item has been given the following disposition codes

Reviewer	Revision Level	Date	Disposition Code	Comments
AUSTAD, STEPHANIE L	0	15-SEP-16	D	
RICHARDS, STEVEN C	0	12-SEP-16	D	
PRATHER, ALLEN R	0	19-SEP-16	D	

Final Disposition: D

VDR Number:	VDR-562658
Revision Level:	0
Project Number:	31055 - 503528
Transmittal Number:	31055-503528-150.1
Transmittal Status:	Information Only
Line Item:	1
Review Remarks:	

Disposition Code::	By::	Final Comments::
D	Austad, Stephanie Lee	

AREVA

AREVA Federal Services LLC

DATA TRANSMITTAL FORM

Supplier:	C & H Construction Company, Inc.	**DTF No:** CH-ADM-155	Page 1 of 1
P.O./SC No:	15C3011496	**Date:**	5/8/16
Type of Submittal:	☒ First ☐ Re-Submittal	**SDRL List Item No:**	ADM-155
Submitted for:	☒ *Approval* ☐ *Review* ☐ *Information*	***Number of Copies Submitted***	***1***
Submitted By:	Shelly Furukawa (Name)	[signature] (Signature)	Document Control (Title)

ITEM NUMBER	DOCUMENT NUMBER	REVISION NUMBER	DOCUMENT DESCRIPTION	AFS DISPOSITION
01	221123.13	n/a	Booster Pumps Product Data Compliance	☒ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
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				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA

Comments: No Comments

Technical Reviewer (i.e., RE, PTL, SME, QA, etc.) [signature]

Date 6/14/2016

AFS DISPOSITION CODES AND DEFINITIONS			
AP	Approved	Work may proceed.	Resubmittal is not required
AWC	Approved with Comment	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
REV	Reviewed	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
RWC	Reviewed with Comment	Work may proceed; **subject to incorporation and compliance w/ Buyer comments.**	**Correct and resubmit**
DS	Disapproved	**Work may not proceed.**	**Correct and resubmit**
RSA	Receipt Submittal Acknowledged	No other action required.	

If, in the judgment of the Supplier, the incorporation of AFS' comments will result in a change to the Purchase Order/Subcontract, work shall not proceed and the Supplier shall immediately provide a written notice to AFS' C&P Representative describing the change.

Project Manager (PM) / Engineering Manager (EM) or Designated Individual (DI) Approval PHAN Ray Digitally signed by PHAN Ray DN: o=AREVA GROUP, 2.5.4.45=1408A92103877362097264, cn=PHAN Ray Date: 2016.06.15 14:42:56 -06'00' ***Date:***

AFS-EN-FRM-023 Rev 01 (Effective August 18, 2014)
Refer to AFS-EN-PRC-012

GRUNDFOS

Submittal Data

PROJECT:		UNIT TAG:		QUANTITY:	
		TYPE OF SERVICE:			
REPRESENTATIVE:		SUBMITTED BY:		DATE:	
ENGINEER:		APPROVED BY:		DATE:	
CONTRACTOR:		ORDER NO.:		DATE:	

Product photo could vary from the actual product

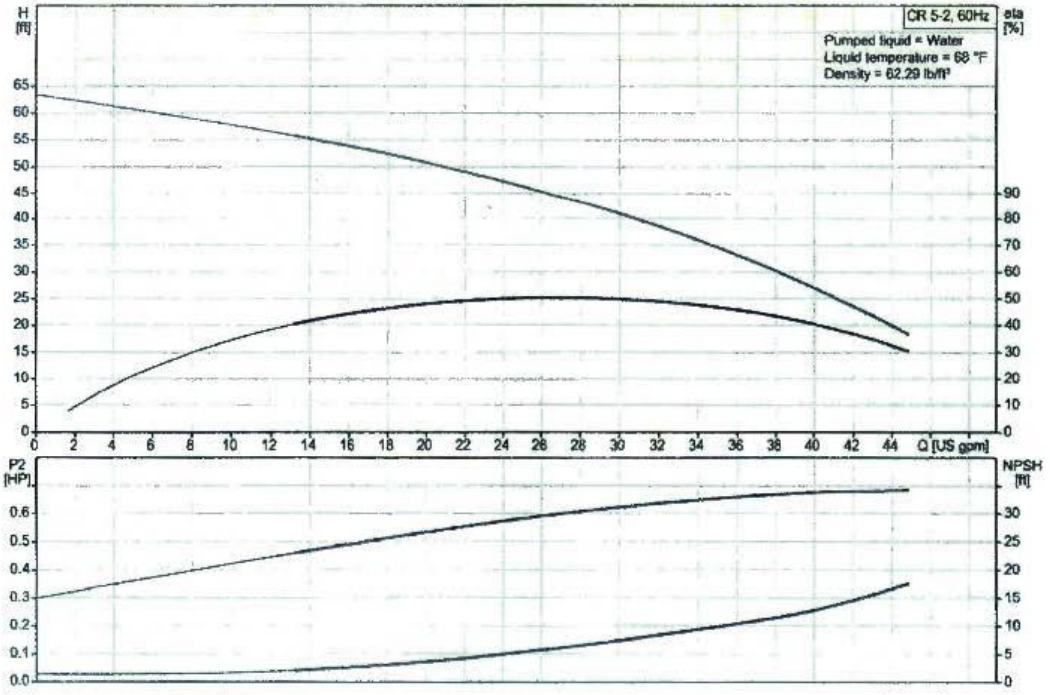
CR 5-2

Vertical, multistage centrifugal pump with suction and discharge ports on the same level. The pump head and base are in cast iron. All other wetted parts are in stainless steel (EN 1.4301)(AISI 304)

Conditions of Service	
Flow:	
Head:	
Efficiency:	
Liquid:	Water
Temperature:	68 °F
NPSH required:	ft
Viscosity:	
Specific Gravity:	1.000

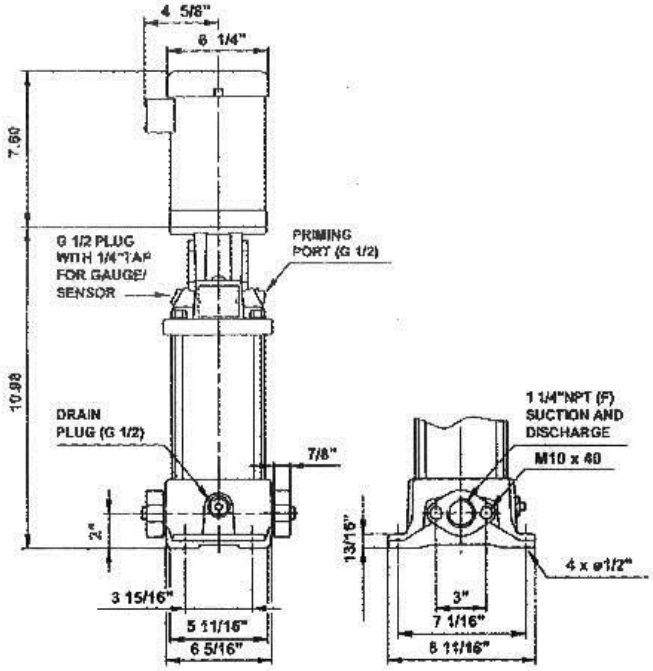
Pump Data	
Max pressure at stated temperature:	232 psi / 250 °F
Liquid temperature range:	-4 .. 248 °F
Maximum ambient temperature:	104 °F
Approvals:	ANSI/NSF61
Shaft seal:	HQQE
Flange standard:	OVAL
Pipe connection:	1 1/4" NPT
Product number:	96084097

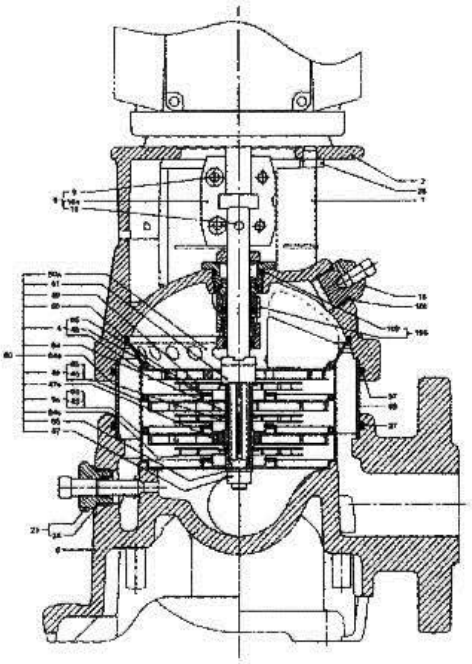
Motor Data	
Rated power - P2:	0.75 HP
Rated voltage:	208-230/460 V
Main frequency:	60 Hz
Enclosure class:	55 Dust/Jetting
Insulation class:	F
Motor protection:	NONE
Motor type:	71BA



GRUNDFOS

Submittal Data





Materials:

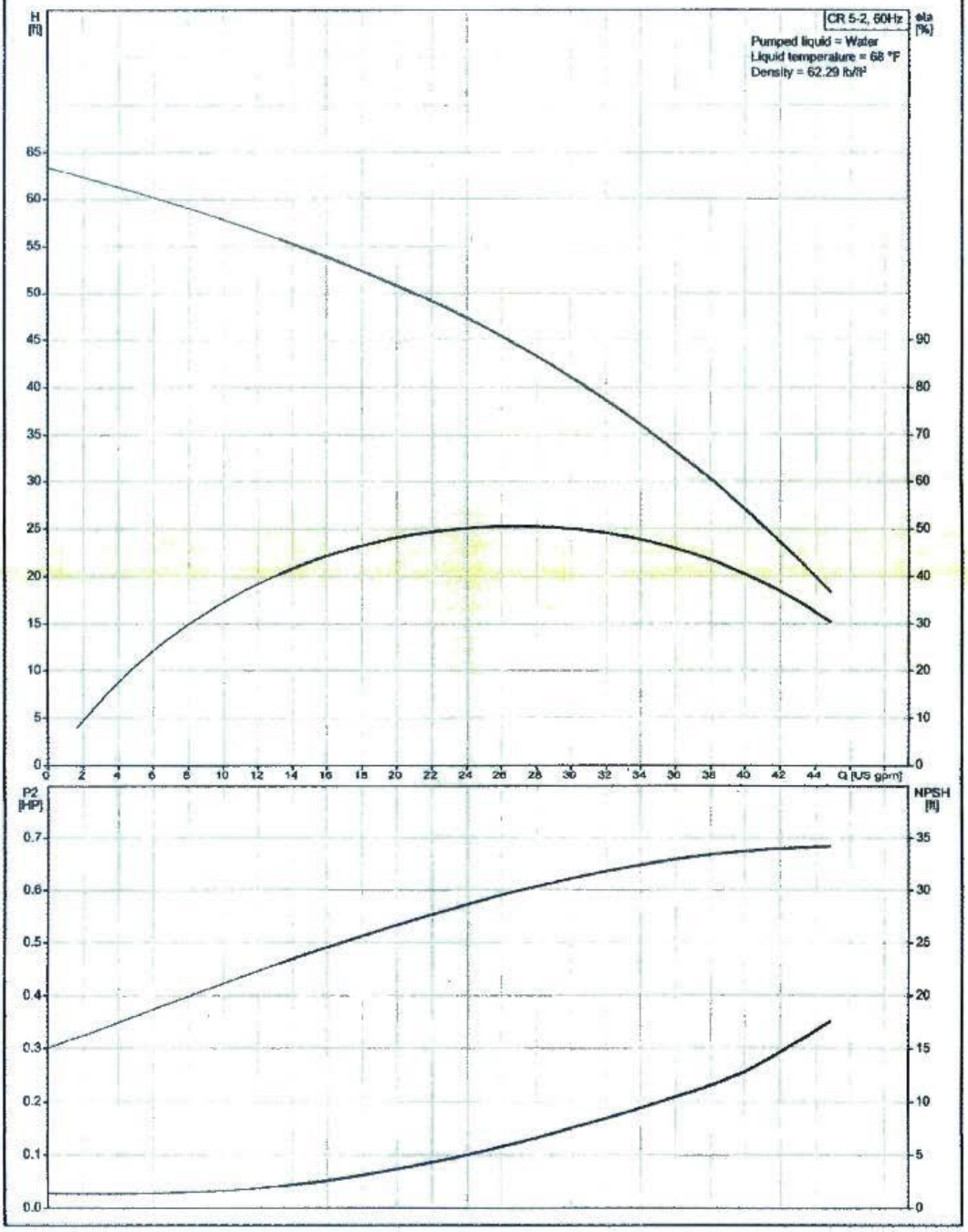
Pump housing:	Cast iron EN-JL1030 ASTM 25 B
Impeller:	Stainless steel DIN W.-Nr. 1.4301 AISI 304
Material code:	A
Code for rubber:	E

GRUNDFOS

Company name:
Created by:
Phone:

Date: 1/12/2016

96084097 CR 5-2 60 Hz

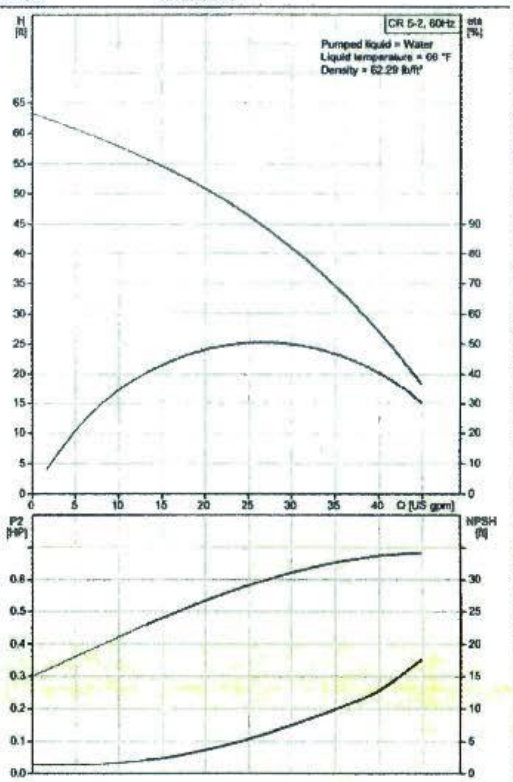


GRUNDFOS

Company name:
Created by:
Phone:

Date: 1/12/2016

Description	Value
General information:	
Product name:	CR 5-2 A-B-A-E-HQQE
Product No.:	96084097
EAN:	5700395189353
Price:	On request
Technical:	
Speed for pump data:	3439 rpm
Rated flow:	30.4 US gpm
Rated head:	42.32 ft
Head max:	67.26 ft
Impellers:	2
Shaft seal:	HQQE
Approvals on nameplate:	[redacted]
Curve tolerance:	ISO9906:2012 3B
Stages:	2
Pump version:	A
Model:	A
Cooling:	TEFC
Materials:	
Pump housing:	Cast iron EN-JL1030 ASTM 25 B
Impeller:	Stainless steel DIN W.-Nr. 1.4301 AISI 304
Material code:	A
Code for rubber:	E
Installation:	
Maximum ambient temperature:	104 °F
Max pressure at stated temperature:	232 psi / 250 °F 232 psi / -4 °F
Flange standard:	OVAL
Connect code:	B
Pipe connection:	1 1/4" NPT
Flange size for motor:	56C
Liquid:	
Pumped liquid:	Water
Liquid temperature range:	-4 .. 248 °F
Liquid temp:	68 °F
Density:	62.29 lb/ft³
Electrical data:	
Motor type:	71BA
Number of poles:	2
Rated power - P2:	0.75 HP
Power (P2) required by pump:	0.75 HP 0.75 HP
Main frequency:	60 Hz
Rated voltage:	3 x 208-230/460 V
Service factor:	1,25
Rated current:	2,40-2,30/1,20 A
Starting current:	590-650 %
Cos phi - power factor:	0,84-0,78
Rated speed:	3430-3460 rpm
Enclosure class (IEC 34-5):	55 Dust/Jetting
Insulation class (IEC 85):	F
Motor protection:	NONE
Motor Number:	85900702
Others:	
Net weight:	46.5 lb
Gross weight:	57.6 lb



GRUNDFOS

Company name:
Created by:
Phone:

Date: 1/12/2016

Description	Value
Shipping volume:	1.77 ft³

431.13
06/21/2006
Rev. 05

VENDOR DATA
TRANSMITTAL & DISPOSITION FORM

31055 - 503528-145.1 — To be completed by Supplier/Subcontractor

Purchase Order or Subcontract Number: 00121414 — Project Title/Number: RHLLW:1858 Administration Building Spec / 31055

Submittal Number: CH-Adm-148 — Supplier/Subcontractor Name: AREVA Federal Services

Submittal Date: 02/10/2016 — Address: 2070 West Broadway, Idaho Falls ID, 83402

VDS Item No.	VDT Item No.	Specification/ Drawing Reference	Tag Number	Submittal Status	Revision Level	Supplier/ Subcontractor Document Number (if applicable)	Description	VDR Number	Disp Code
145	01	1858-221119	NA	IO	0	CH-Adm-148	Product Data Compliance for Domestic Water Specialties	VDR-532063	D

Remarks

Julethia Hawthorn — Digitally signed by HAWTHORN Julethia
Date: 2016.02.10 11:55:21 -05'00'

Supplier/Subcontractor Authorized Signature / Date

To Be Completed by Contractor/AE

Cindy Dabb — 02/17/2016

Authorized Signature / Date

Vendor Data Review System Final Disposition Screen

This vendor data item has been given the following disposition codes

Reviewer	Revision Level	Date	Disposition Code	Comments
RICHARDS, STEVEN C	0	17-FEB-16	D	
AUSTAD, STEPHANIE L	0	17-FEB-16	D	

Final Disposition: D

VDR Number:	VDR-532063
Revision Level:	0
Project Number:	31055 - 503528
Transmittal Number:	31055-503528-145.1
Transmittal Status:	Information Only
Line Item:	1
Review Remarks:	

Disposition Code::	By::	Final Comments::
D	Austad, Stephanie Lee	

AREVA

AREVA Federal Services LLC

DATA TRANSMITTAL FORM

Supplier:	C & H Construction Company, Inc.	**DTF No:** CH-ADM-148		Page 1 of 1
P.O./SC No:	15C3011496		**Date:**	1/25/16
Type of Submittal:	☒ First ☐ Re-Submittal		**SDRL List Item No:**	ADM-148
Submitted for:	☒ *Approval* ☐ *Review* ☐ *Information*		***Number of Copies Submitted***	1
Submitted By:	Shelly Furukawa	Shelly Furukawa (signature)		Document Control
	(Name)	**(Signature)**		**(Title)**

ITEM NUMBER	DOCUMENT NUMBER	REVISION NUMBER	DOCUMENT DESCRIPTION	AFS DISPOSITION
01	221119	n/a	Domestic Water Specialties Product Compliance	☒ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA

Comments: No Comment

Technical Reviewer (i.e., RE, PTL, SME, QA, etc.) [signature]

Date 1/29/2016

AFS DISPOSITION CODES AND DEFINITIONS			
AP	Approved	Work may proceed	Resubmittal is not required
AWC	Approved with Comment	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
REV	Reviewed	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
RWC	Reviewed with Comment	Work may proceed, **subject to incorporation and compliance w/ Buyer comments.**	**Correct and resubmit**
DS	Disapproved	**Work may <u>not</u> proceed.**	**Correct and resubmit**
RSA	Receipt Submittal Acknowledged	No other action required.	

If, in the judgment of the Supplier, the incorporation of AFS' comments will result in a change to the Purchase Order/Subcontract, work shall not proceed and the Supplier shall immediately provide a written notice to AFS' C&P Representative describing the change.

Project Manager (PM) / Engineering Manager (EM) or Designated Individual (DI) Approval JONES Adam (digitally signed) **Date:**

AFS-EN-FRM-023 Rev 01 (Effective August 18, 2014)
Refer to AFS-EN-PRC-012

ES-LF009

For Health Hazard Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

LEAD FREE

Series LF009

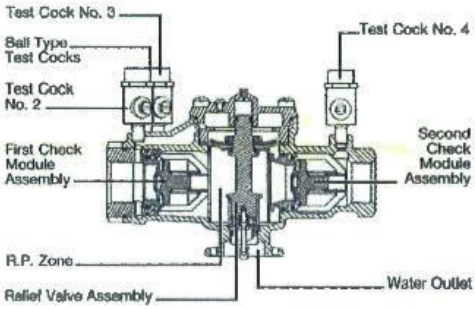
Reduced Pressure Zone Assemblies

Sizes: ¼" – 3" (8 – 80mm)

Series LF009 Reduced Pressure Zone Assemblies are designed to protect potable water supplies in accordance with national plumbing codes and water authority requirements. This series can be used in a variety of installations, including the prevention of health hazard cross-connections in piping systems or for containment at the service line entrance. The LF009 features Lead Free* construction to comply with Lead Free* installation requirements.

This series features two in-line, independent check valves, captured springs and replaceable check seats with an intermediate relief valve. Its compact modular design facilitates easy maintenance and assembly access. Sizes ¼" – 1" (8 – 25mm) shutoffs have tee handles.

LF009



Features

- Single access cover and modular check construction for ease of maintenance
- Top entry - all internals immediately accessible
- Captured springs for safe maintenance
- Internal relief valve for reduced installation clearances
- Replaceable seats for economical repair
- Lead Free* cast copper silicon alloy body construction for durability ¼" – 2" (8 – 50mm)
- Fused epoxy coated cast iron body 2½" and 3" (65 and 80mm)
- Ball valve test cocks — screwdriver slotted ¼" – 2" (8 – 50mm)
- Large body passages provides low pressure drop
- Compact, space saving design
- No special tools required for servicing

Specifications

A Reduced Pressure Zone Assembly shall be installed at each potential health hazard location to prevent backflow due to backsiphonage and/or backpressure. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat discs shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the waterway exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. Body and shutoffs shall be constructed using Lead Free* cast copper silicon alloy materials. Lead Free* reduced pressure zone assembly shall comply with state codes and standards, where applicable, requiring reduced lead content.

The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks and an air gap drain fitting. The assembly shall meet the requirements of: ASSE Std. 1013, AWWA Std. C511, CSA B64.4. Shall be a Watts Series LF009.

Now Available
WattsBox Insulated Enclosures.
For more information, send for literature ES-WB.

NOTICE
Inquire with governing authorities for local installation requirements

*The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.

WATTS®

Available Models: ¼" – 2" (8 – 50mm)

Suffix:

QT – quarter-turn ball valves
S – strainer
LF – without shutoff valves
PC – internal polymer coating

Prefix:

U – union connections

Available Models: 2½" – 3" (65 – 80mm)

Suffix:

NRS – non-rising stem resilient seated gate valves
OSY – UL/FM outside stem and yoke resilient seated gate valves
S-FDA – FDA epoxy coated strainer
QT-FDA – FDA epoxy coated quarter-turn ball valves
LF – without shutoff valves

Note: The installation of a drain line is recommended. When installing a drain line, an air gap is necessary (see ES-AG).

Materials: ¼" – 2" (8 – 50mm)

Lead Free* cast copper silicon alloy body construction, silicone rubber disc material in the first and second check plus the relief valve. Replaceable polymer check seats for first and second checks. Removable stainless steel relief valve seat. Stainless steel cover bolts.

Standardly furnished with NPT body connections.
Model LF009QT furnished with quarter-turn, full port, resilient seated, Lead Free* cast copper silicon alloy body ball valve shutoffs.

Materials: 2½" and 3" (65 – 80mm)

- (FDA approved) Epoxy coated cast iron unibody with plastic seats
- Relief valve with stainless steel seat and trim
- Lead Free cast copper silicon alloy body ball valve test cocks

Pressure / Temperature

Sizes ¼" – 2" (8 – 50mm) Suitable for supply pressure up to 175psi (12 bar). Water temperature: 33°F – 180°F (0.5° – 75°C).

Sizes 2½" and 3" (65 and 80mm) are suitable for supply pressures up to 175psi (12.1 bar) and water temperature at 110°F (43°C) continuous, 140°F (60°C) intermittent.

Standards

USC
ASSE No. 1013
AWWA C511
CSA B64.4
IAPMO File No. 1563.

Approvals

ASSE, AWWA, CSA, IAPMO

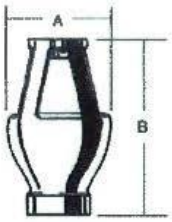
Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

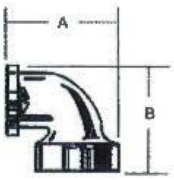
Approval models QT, PC, NRS, OSY.

UL Classified
2½" and 3" (65 and 80mm) with OSY gate valves.
¾" - 2" (20-50mm) without shutoff valves (-LF) (except LF009M3LF)

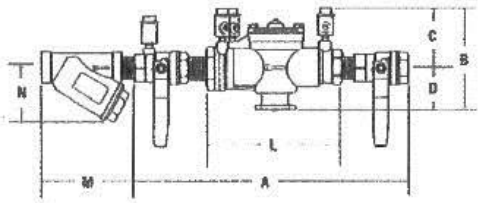
Air Gaps and Elbows

MODEL		DRAIN OUTLET		DIMENSIONS				WEIGHT	
	for 909, 009 and 993 sizes			A		B			
		in.	mm	in.	mm	in.	mm	lbs.	kgs.
909AGA	¼"–½" 009, ¼" 009M2/M3	½	13	2⅜	60	3¼	70	0.625	0.28
909AGC	¾"–1" 009/909, 1"–1½" 009M2	1	25	3¼	83	4⅞	124	1.5	0.68
909AGF	1¼"–2" 009M1, 1¼"–3" 009/909, 2" 009M2, 4"–6" 993	2	51	4⅜	111	6¾	171	3.25	1.47
909AGK	4"–6" 909, 8"–10" 909M1	3	76	6¼	162	9⅝	244	6.25	2.83
909AGM	8"–10" 909	4	102	7⅜	187	11¼	286	15.5	7.03
909ELA	¼"–½" 009, ¾" 009M2/M3	–	–	–	–	–	–	–	–
909ELC	¾"–1" 009/909	–	–	2⅜	60	2⅜	60	0.38	0.17
* 909ELF	1¼"–2" 009M1, 1¼"–2" 009/909, 2" 009M2, 4"–6" 993	–	–	3⅝	92	3⅝	92	2	0.91
* 909ELH Vertical	2½"–3" 009/909	–	–	–	–	–	–	–	–





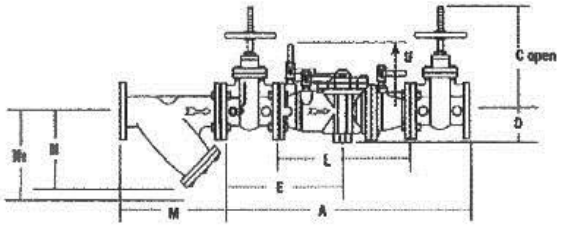
Dimensions and Weight: ¼" – 2" (8 – 50mm) LF009

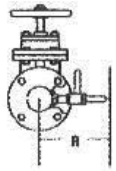


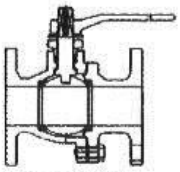
LF009 ¼" – 2"

SIZE (DN)		DIMENSIONS (APPROX.)												WEIGHT	
		A		B		C		D		L		M		N			
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.
¼	8	10	250	4⅝	117	3⅜	86	1¼	32	5½	140	2⅜	60	2½	64	5	2
⅜	10	10	250	4⅝	117	3⅜	86	1¼	32	5½	140	2⅜	60	2½	64	5	2
½	15	10	250	4⅝	117	3⅜	86	1¼	32	5½	140	2¾	70	2¼	57	5	2
¾	20	10¾	273	5	127	3½	89	1½	38	6¾	171	3⅛	81	2¾	70	6	3
1	25	16¾	425	5½	140	3	76	2½	64	9½	241	3¾	95	3	76	12	5
1¼	32	17⅜	441	6	150	3½	89	2½	64	11⅜	289	4⅜	113	3½	89	15	6
1½	40	17⅞	454	6	150	3½	89	2½	64	11¼	283	4⅞	124	4	102	16	7
2	50	21¾	543	7¾	197	4½	114	3¼	83	13½	343	5⅞	151	5	127	30	13

Dimensions and Weight: 2½" and 3" (65 and 80mm) LF009







Watts G-4000 Series
QT – Ball Valves

STRAINER SIZE		DIMENSIONS (APPROX.)						WEIGHT	
		M		N		Mt†			
in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.
2½	65	10	254	6½	165	9¾	248	28	12.7
3	80	10⅛	257	7	178	10	254	34	15.4

†Clearance for servicing

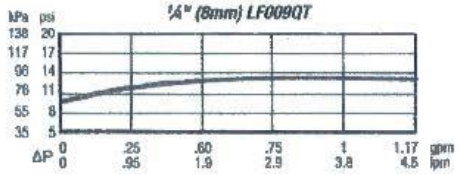
MODEL	SIZE (IN	DIMENSIONS (APPROX.)												WEIGHT	
		A		C		D		E		L		R		U			
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.
LF009LF	2½	65	—	—	—	—	4½	114	—	—	18¼	460	—	—	10¾	270	76	34.5
LF009OSY	2½	65	33¼	845	15¾	403	4½	114	16¼	416	18¼	460	7¾	197	10¾	270	166	75.3
LF009NRS	2½	65	33¼	845	11⅜	289	4½	114	16⅜	416	18¼	460	7¾	197	10¾	270	161	73.0
LF009QTFDA	2½	65	33¼	845	6	152	4½	114	16¼	416	18¼	460	7¾	197	10¾	270	150	68.0
LF009LF	3	80	—	—	—	—	4½	114	—	—	18¼	460	—	—	10¾	270	76	34.5
LF009OSY	3	80	34¼	870	16½	470	4½	114	16¾	422	18¼	460	8¾	222	10¾	270	198	89.8
LF009NRS	3	80	34¼	870	12¾	324	4½	114	16⅝	422	18¼	460	8¾	222	10¾	270	191	86.6
LF009QTFDA	3	80	34¼	870	7	178	4½	114	16¼	422	18¼	460	8¾	222	10¾	270	156	71.7

Capacity

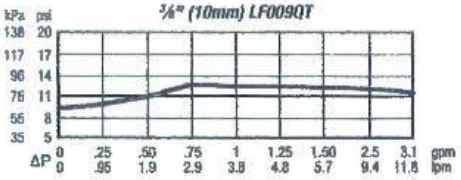
Performance as established by an independent testing laboratory.

*Typical maximum system flow rate (7.5 feet/sec., 2.3 meters/sec.)

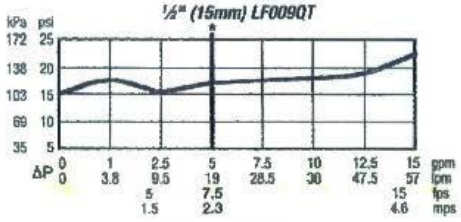
¼" (8mm) LF009QT



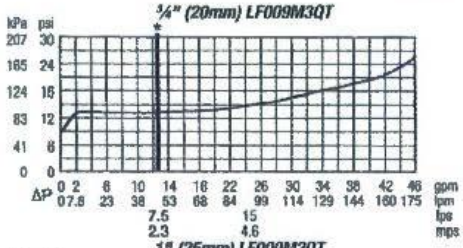
⅜" (10mm) LF009QT



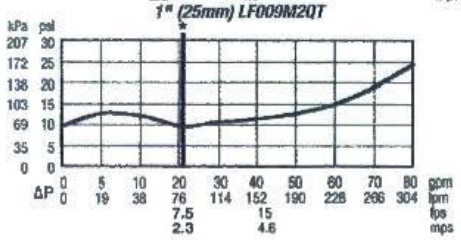
½" (15mm) LF009QT



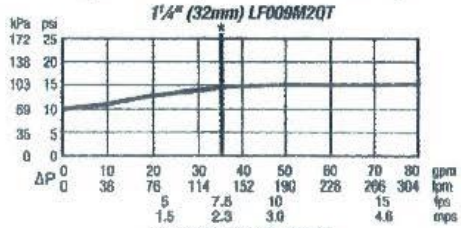
¾" (20mm) LF009M3QT



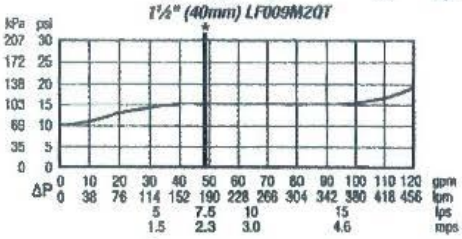
1" (25mm) LF009M2QT



1¼" (32mm) LF009M2QT

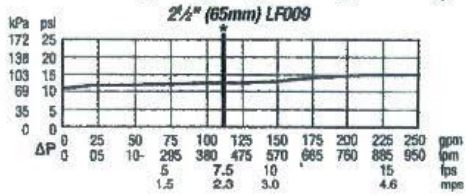


1½" (40mm) LF009M2QT

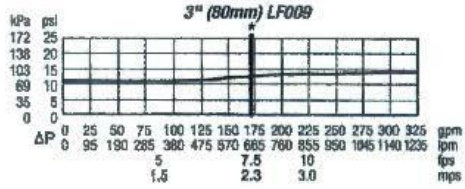


2" (50mm) LF009M2QT

2½" (65mm) LF009



3" (80mm) LF009



WATTS®

A Watts Water Technologies Company

ISO 9001-2008 CERTIFIED

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Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • www.watts.ca

ES-LF009 1318

431.13
06/21/2006
Rev. 05

VENDOR DATA
TRANSMITTAL & DISPOSITION FORM

31055-503528-166.1 — To be completed by Supplier/Subcontractor

Purchase Order or Subcontract Number: 00121414 — Project Title/Number: RHLLW:1858 Administration Building Spec / 31055

Submittal Number: CH-Adm-172 — Supplier/Subcontractor Name: AREVA Federal Services

Submittal Date: 02/10/2016 — Address: 2070 West Broadway, Idaho Falls ID, 83402

VDS Item No.	VDT Item No.	Specification/ Drawing Reference	Tag Number	Submittal Status	Revision Level	Supplier/ Subcontractor Document Number (if applicable)	Description	VDR Number	Disp Code
166	01	1858-223300	NA	IO	0	CH-Adm-172	Product Data Compliance for Water Heaters	VDR-532068	D

Remarks

Julethia Hawthorn — Digitally signed by HAWTHORN Julethia
Date: 2016.02.10 12:29:34 -05'00'

Supplier/Subcontractor Authorized Signature / Date

To Be Completed by Contractor/AE

Cindy Dabb — 02/17/2016

Authorized Signature / Date

Vendor Data Review System Final Disposition Screen

This vendor data item has been given the following disposition codes

Reviewer	Revision Level	Date	Disposition Code	Comments
AUSTAD, STEPHANIE L	0	17-FEB-16	D	
RICHARDS, STEVEN C	0	17-FEB-16	D	

Final Disposition: D

VDR Number:	VDR-532068
Revision Level:	0
Project Number:	31055 - 503528
Transmittal Number:	31055-503528-166.1
Transmittal Status:	Information Only
Line Item:	1
Review Remarks:	

Disposition Code::	By::	Final Comments::
D	Austad, Stephanie Lee	

AREVA

AREVA Federal Services LLC

DATA TRANSMITTAL FORM

Supplier:	C & H Construction Company, Inc.	**DTF No:**	CH-ADM-172	Page 1 of 1	
P.O./SC No:	15C3011496			**Date:**	2/2/16
Type of Submittal:	☒ First	☐ Re-Submittal		**SDRL List Item No:**	ADM-172
Submitted for:	☒ *Approval* ☐ *Review* ☐ *Information*			***Number of Copies Submitted:* 1**	
Submitted By:	Shelly Furukawa **(Name)**	[signature] **(Signature)**		Document Control **(Title)**	

ITEM NUMBER	DOCUMENT NUMBER	REVISION NUMBER	DOCUMENT DESCRIPTION	AFS DISPOSITION
01	223300	n/a	Water Heaters Product Data Compliance	☒ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
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				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA

Comments: No Comments

Technical Reviewer (i.e., RE, PTL, SME, QA, etc.) [signature]

Date 2/4/2016

AFS DISPOSITION CODES AND DEFINITIONS			
AP	Approved	Work may proceed.	Resubmittal is not required
AWC	Approved with Comment	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
REV	Reviewed	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
RWC	Reviewed with Comment	Work may proceed: **subject to incorporation and compliance w/ Buyer comments.**	**Correct and resubmit**
DS	Disapproved	**Work may not proceed.**	**Correct and resubmit**
RSA	Receipt Submittal Acknowledged	No other action required.	

If, in the judgment of the Supplier, the incorporation of AFS' comments will result in a change to the Purchase Order/Subcontract, work shall not proceed and the Supplier shall immediately provide a written notice to AFS' C&P Representative describing the change.

Project Manager (PM) / Engineering Manager (EM) or Designated Individual (DI) Approval JONES Adam Digitally signed by JONES Adam ... Date: 2016.02.05 ... ***Date:***

AFS-EN-FRM-023 Rev 01 (Effective August 18, 2014)
Refer to AFS-EN-PRC-012

ADM-172
Product Data
Compliance

SpecAdvantage with PhD

For Commercial and Industrial Applications

Specifications
Electric Tankless Hot Water Heater

Applications

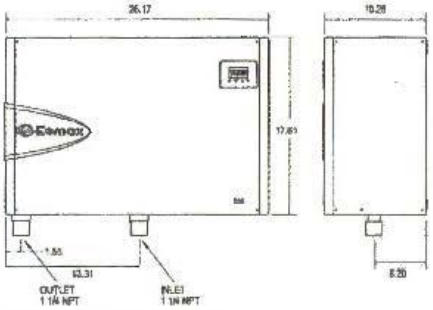
- Booster applications up to sanitation temperatures
- Commercial kitchen
- Process heating
- High volume domestic hot water
- Glycol heating
- Emergency eye wash and safety showers
- 40 gpm washdown

Performance Features

- Designed for commercial and industrial applications
- Capable of high volume and high temperature applications
- Fully modulating - Predictive control algorithm and diverse safety features ensures precise temperature control
- T&P not required per UL499 (check local codes)
- Thermo-Optical Sensor for infrared element monitoring
- Field programmable, updatable firmware, and adjustable turn-on
- Highly visible LCD display and control with built in diagnostics

Optional Features (NEMA cabinet required)

- N4, N4X (304SS) N4X6 (316SS) enclosures
- Free standing legs
- Freeze protection for harsh climate, up to -30°F
- Electrical disconnect
- GFCI
- Explosion proof – C1D2 Compliant, local certification required. Class 2 purge and pressurization system provided with pressure switch for alarm controls. For classification other than C1D2 please contact the factory to discuss options.
- Siren and beacon - audible and visual alarm (C1D2 compliant when paired with explosion proof package)

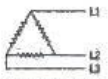


65 lbs. Designed for wall mounted installation.
Free standing legs and other options listed on page 8.

Electrical configuration and requirements

All Eemax three phase units are custom made to order and as such, are non-returnable and non-refundable. We urge you, therefore, to check your electrical supply, making sure all criteria for operating your Eemax water heater are met.

Eemax 600v, 480v and 208v
Three Phase Units
Delta Configuration
Requires: 3 Lives and 1 Ground (earth)



Information and product specifications contained in this document are subject to change without notice.

U.S. Patent Pending

Suggested Specification

Tankless water heater shall be an Eemax SpecAdvantage model number AP_____.

Optional factory installation in a ____(N4/N4X/N4X6) enclosure.

Enclosure to be fitted with the following features:

____	**FP**	Freeze protection (-30F)
____	**EDS**	Non-fused disconnect
____	**FDS**	Fused disconnect
____	**EP**	Explosion proof (C1D2 compliant)
____	**GFCI**	True RMS GFCI with digital display and reset
____	**SK**	24" legs for free standing applications
____	**RD**	Remote display
____	**SB**	Siren and beacon

Tankless water heater must have water connections on the bottom, and be constructed with NSF 61 listed materials. Direct heating element to be non-ferrous, cartridge style, designed for field replacement. Tankless water heater to utilize a dual PID algorithm, actively managing power application to real-time system demand. Integrated flow meter capable of volumes in excess of 40 GPM drives predictive control algorithm. Water heater must be protected by redundant safeties. Redundant safeties to include thermo mechanical safety switches, infrared element monitoring via thermo optical sensors, and dual temperature monitoring via master control board. Tankless water heater user interface must have the following capabilities:

- Selectable display including Celsius/Fahrenheit, inlet temperature, outlet temperature, flow rate, and set point temperature.
- Must be capable of displaying flow rate in gallons per minute or liters per minute.
- Diagnostic features to include error and fault code display.
- Control board must maintain error/fault history of 9 events.
- Capable of factory coded temperature setting (max. and min.)
- Capable of firmware upgrades via USB port
- Capable of BMS integration
- Available Data logger for monitoring of internal I/O values and 4 external inputs.
- Compliant with ANSI Z358.1 tepid water without additional mixing or purge features (inlet temperatures must not exceed 100°F when selecting an EE or EFD option)

7

SpecAdvantage with PhD

For Commercial and Industrial Applications

Specifications
Electric Tankless Hot Water Heater

Suffix Definitions

- **S** Sanitation. Shipped at 150°F with temp range of 100°F-130°F max.
- **EE** Emergency Eyewash. Shipped with max. temp of 90°F. Shipped with display "Locked."
- **EFD** Emergency Eye, Face & Drench. Max. temp of 90°F.

Note: Models without a suffix are set to a maximum temperature of 140°F if the turn on is greater than 1.5 gpm. Models with a 1.0 or 1.5 gpm turn on will be set for 120° maximum temperature.

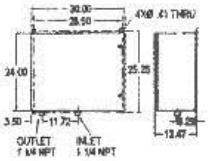
PhD Pressure Drop

Flow Rate (GPM)	Delta PSI
2	0
3	0
4	0
6	0
8	1
11	3
12	4
15	6
18	8
20	10
22	13
24	14
27	17
30	22
33	26
35	30
37	34
40	43

NEMA Cabinet Options

Dimensions: 24"H x 30"W x 13.5"D
(Total weight est 130 lbs.)

- **N4** Waterproof powder coated steel
- **N4X** Waterproof corrosion resistant 304 stainless steel
- **N4Kit** Waterproof corrosion resistant 316 stainless steel



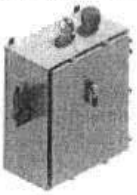
MODEL NUMBER	kW	BTU	AMPS PER PHASE	TURN ON (GPM)	RECOMMENDED WIRE SIZE (60° C/Cu)	TEMPERATURE RISE °F 3.0 GPM	4.0 GPM	5.0 GPM	6.0 GPM	20.0 GPM	23.0 GPM	26.0 GPM	30.0 GPM	40.0 GPM
VOLTS 208/240 1Ø														
AP032208	32	109,189	89	1.0*	1 AWG	73°	55°	36°	29°	11°	10°	8°	7°	5°
AP032204 EE	32	109,189	89	1.0*	1 AWG	73°	55°	36°	29°	11°	10°	8°	7°	5°
AP032208 S	32	109,189	89	1.0*	1 AWG	73°	55°	36°	29°	11°	10°	8°	7°	5°
AP036208	36	122,837	100	1.0*	1 AWG	82°	61°	49°	41°	12°	11°	9°	8°	6°
AP036208 EE	36	122,837	100	1.0*	1 AWG	82°	61°	49°	41°	12°	11°	9°	8°	6°
AP036208 S	36	122,837	100	1.0*	1 AWG	82°	61°	49°	41°	12°	11°	9°	8°	6°
AP041208	41	143,319	112	1.0*	1 AWG	93°	70°	56°	47°	14°	12°	11°	9°	7°
AP041208 EFD	41	143,319	112	1.0*	1 AWG	93°	70°	56°	47°	14°	12°	11°	9°	7°
AP041208 S	41	143,319	112	1.0*	1 AWG	93°	70°	56°	47°	14°	12°	11°	9°	7°
AP054208	54	184,256	150	1.5*	2/0 AWG	123°	92°	61°	49°	18°	16°	14°	12°	9°
AP054208 EFD	54	184,256	150	1.5*	2/0 AWG	123°	92°	61°	49°	18°	16°	14°	12°	9°
AP054208 S	54	184,256	150	1.5*	2/0 AWG	123°	92°	61°	49°	18°	16°	14°	12°	9°
AP064208	64	218,377	178	2.5	3/0 AWG	146°	109°	73°	58°	22°	19°	17°	15°	11°
AP064208 EFD	64	218,377	178	2.5	3/0 AWG	146°	109°	73°	58°	22°	19°	17°	15°	11°
AP064208 S	64	218,377	178	2.5	3/0 AWG	146°	109°	73°	58°	22°	19°	17°	15°	11°
VOLTS 480 3ØD														
AP036480	36	122,837	43	1.0*	8 AWG	82°	61°	41°	33°	12°	11°	9°	8°	6°
AP036480 EE	36	122,837	43	1.0*	8 AWG	82°	61°	41°	33°	12°	11°	9°	8°	6°
AP036480 S	36	122,837	43	1.0*	8 AWG	82°	61°	41°	33°	12°	11°	9°	8°	6°
AP039480	39	133,074	47	1.0*	8 AWG	89°	67°	53°	44°	13°	12°	10°	9°	7°
AP039480 EE	39	133,074	47	1.0*	8 AWG	89°	67°	53°	44°	13°	12°	10°	9°	7°
AP039480 S	39	133,074	47	1.0*	8 AWG	89°	67°	53°	44°	13°	12°	10°	9°	7°
AP048480	48	163,783	58	1.0*	6 AWG	109°	82°	55°	46°	16°	14°	13°	11°	8°
AP048480 EFD	48	163,783	58	1.0*	6 AWG	109°	82°	55°	46°	16°	14°	13°	11°	8°
AP054480	54	184,256	65	1.5*	4 AWG	123°	92°	61°	49°	18°	16°	14°	12°	9°
AP054480 EFD	54	184,256	65	1.5*	4 AWG	123°	92°	61°	49°	18°	16°	14°	12°	9°
AP063480	63	214,965	76	2.5	3 AWG	143°	108°	86°	72°	22°	19°	17°	14°	11°
AP063480 EFD	63	214,956	76	2.5	3 AWG	143°	108°	86°	72°	22°	19°	17°	14°	11°
AP063480 S	63	214,965	76	2.5	3 AWG	143°	108°	86°	72°	22°	19°	17°	14°	11°
AP072480	72	245,674	87	2.5	3 AWG	+	123°	82°	68°	25°	21°	19°	16°	12°
AP072480 EFD	72	245,674	87	2.5	3 AWG	+	123°	82°	68°	25°	21°	19°	16°	12°
AP096480	96	327,565	116	2.5	1/0 AWG	+	+	131°	109°	33°	29°	25°	22°	16°
AP096480 EFD	96	327,565	116	2.5	1/0 AWG	+	+	131°	109°	33°	29°	25°	22°	16°
AP096480 S	96	327,565	116	2.5	1/0 AWG	+	+	131°	109°	33°	29°	25°	22°	16°
AP108480	108	368,511	130	2.5	1/0 AWG	+	+	123°	98°	37°	32°	28°	25°	18°
AP108480 EFD	108	368,511	130	2.5	1/0 AWG	+	+	123°	98°	37°	32°	28°	25°	18°
AP129480	126	429,930	151	2.5	2/0 AWG	+	+	143°	115°	43°	37°	33°	29°	22°
AP129480 EFD	126	429,930	151	2.5	2/0 AWG	+	+	143°	115°	43°	37°	33°	29°	22°
AP144480	144	491,348	173	2.5	3/0 AWG	+	+	+	+	49°	43°	38°	33°	25°
AP144480 EFD	144	491,348	173	2.5	3/0 AWG	+	+	+	+	49°	43°	38°	33°	25°
VOLTS 600 3ØD														
C AP130600 EFD	130	443,678	125	2.5	1 AWG	+	+	+	118°	44°	29°	34°	26°	22°
C AP150600 EFD	150	511,821	144	2.5	1/0 AWG	+	+	+	+	51°	45°	39°	24°	26°

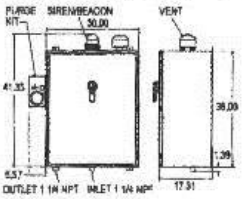
* Units with a 1.0 or 1.5 GPM turn-on are limited to 120°F only. Contact Eemax support for applications above 120°F.
+ Temperature electronically limited to factory preset not to exceed temperature.
"C" indicates verification and compliance to either Underwriters Laboratories (UL) or Intertek (ETL) under CAN/CSA-C22.2 No. 64/No. 88.

NEMA Cabinet Option Accessories:

Dimensions: 36"H x 30"W x 17.5"D
(Total weight est. 225 lbs.)

- **FP** Freeze protection (-30°F)
- **EDS** Non-fused disconnect
- **FDS** Fused disconnect
- **EP** Explosion proof (C1D2 compliant)
- **GFCI** True RMS GFCI with digital display and reset
- **SK** 24" legs for free standing applications
- **RD** Remote display
- **SB** Siren and Beacon





Special Design Service

Inquiries for units for unique applications are welcome.
Call our Technical Service department at 1-800-543-8183.

SPECIFICATIONS

electric tankless hot water heater

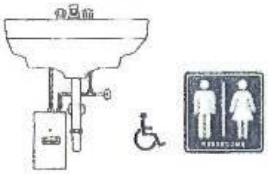
AccuMix

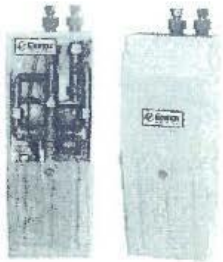
The First Ever Thermostatic Temperature Controlled Heater With Code Compliant Integrated Mixing Valve

EEMAX ACCUMIX MT UNITS

- **PLUMBING ORIENTATION: 3/8" Compression Fittings at TOP of the Unit**
- Eemax Exclusive Turnkey Solution
- Integrated Mixing Valve **Meets ASSE 1070-2004**
- **Meets UPC 413.1** Requirements When Properly Installed
- No Scalding or Temperature Spikes
- Factory Calibrated Mixing Valve and Thermostatic Temperature Control Board for Accuracy
- Product Performance Test Indicator Light
- 99% Energy Efficient Reducing Your Utility Costs
- Quick and Easy Installation — Integrated Valve Solution
- On-Demand Hot Water — Never Run Out
- Factory Temperature Set to 105°F
- 0.3 GPM Turn On
- Quick Temperature Ramp Up Time
- Compatible with All Sensor and Non-Sensor Faucets

MODEL	VOLTS	kW	AMPS
MT004120T	120	3.5	29A
MT005240T	240	4.8	20A
MT007240T	240	6.5	27A
MT010240T	240	9.5	40A
MT006277T	277	8.0	29A
MT010277T	277	10.0	40A



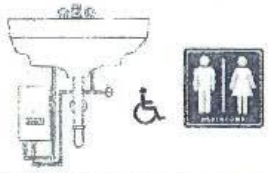


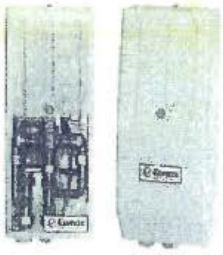
MT VERSION

EEMAX ACCUMIX MB UNITS

- **PLUMBING ORIENTATION: 1/2" Compression Fittings at BOTTOM of the Unit**
- Eemax Exclusive Turnkey Solution
- Integrated Mixing Valve Meets [redacted]
- **Meets UPC 413.1** Requirements When Properly Installed
- No Scalding or Temperature Spikes
- Factory Calibrated Mixing Valve and Thermostatic Temperature Control Board for Accuracy
- Product Performance Test Indicator Light
- 99% Energy Efficient Reducing Your Utility Costs
- Quick and Easy Installation — Integrated Valve Solution
- On-Demand Hot Water — Never Run Out
- Factory Temperature Set to 105°F
- 0.3 GPM Turn On
- Quick Temperature Ramp Up Time
- Compatible with All Sensor and Non-Sensor Faucets

MODEL	VOLTS	kW	AMPS
MB004120T	120	3.5	29A
MB005240T	240	4.8	20A
MB007240T	240	6.5	27A
MB010240T	240	9.5	40A
MB012240T	240	11.5	50A
MB006277T	277	8.0	29A
MB010277T	277	10.0	40A





MB VERSION

QUALITY FEATURES

- **Cut Energy Waste** - Flow switch activates heater only on demand (no standby heat loss) - 99% efficient.
- **Save Water** - "Point of Use".
- **Integrated Mixing Valve Solution.**
- **Continuous Hot Water** – no storage capacity to run out.
- **Easy Installation** – only one cold or hot water line is needed for installation – integral compression fittings for 1/2" pipe on BOTTOM or 3/8" on TOP.
- **Reduces Calcification, Liming and Sedimentation.**
- **Reduces Installation Cost and Material** – No T & P relief valve needed (check local codes).
- **Compact Size** – Dimensions 13.5" H x 5" W x 4" D, weight 8 lbs.
- **Field Serviceable Element** – Replaceable cartridge element (1 year warranty).
- **Warranty** – Heaters are guaranteed against failure due to leaks of "Heater Body/Element Assembly" for a period of FIVE YEARS.
- **High Temperature Limit Switch (ECO)** – protects against element burn out, with reset button.
- **ADA Compliant**

353 Christian Street, Oxford, CT 06478
(800) 543-6153 Info@eemaxinc.com
eemax.com

[redacted]

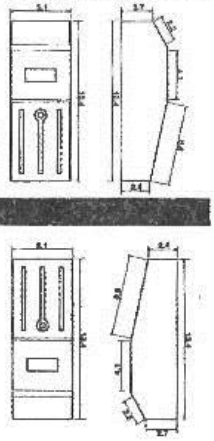
PATENT PENDING TECHNOLOGY

SPECIFICATIONS The First Ever Thermostatic Temperature Controlled Heater With Code Compliant Integrated Mixing Valve

AccuMix

	VOLTAGE	POWER (kW)	# AERATORS SUPPLIED/UNIT	SUPPLY CIRCUITS REQUIRED	RECOMMENDED WIRE SIZE	TURN-ON (GPM)	MAX EFFECTIVE FLOW (GPM)	WATER CONNECTIONS	COMPRESSION FITTINGS	TEMP RISE AT 0.5 GPM (F)	TEMP RISE AT 1.0 GPM (F)	TEMP RISE AT 1.5 GPM (F)
MT PRODUCT LINE – 3/8" COMPRESSION FITTINGS AT TOP OF UNIT												
MT004120T	120	3.5	1	29A	10awg	0.3	0.5	3/8"	Top	48°	—	—
MT005240T	240*	4.8	1	20A	12awg	0.3	1.5	3/8"	Top	64°	31°	21°
MT007240T	240*	6.5	2	27A	10awg	0.3	1.5	3/8"	Top	89°	44°	30°
MT010240T	240*	9.5	3	40A	8awg	0.3	1.5	3/8"	Top	—	65°	43°
MT008277T	277	8.0	2	29A	10awg	0.3	1.5	3/8"	Top	—	55°	36°
MT010277T	277	10.0	3	40A	8awg	0.3	1.5	3/8"	Top	—	68°	46°
MB PRODUCT LINE – 1/2" COMPRESSION FITTINGS AT BOTTOM OF UNIT												
MB004120T	120	3.5	1	29A	10awg	0.3	1.5	1/2"	Bottom	48°	24°	16°
MB005240T	240*	4.8	1	20A	12awg	0.3	1.5	1/2"	Bottom	64°	31°	21°
MB007240T	240*	6.5	2	27A	10awg	0.3	1.5	1/2"	Bottom	89°	44°	30°
MB010240T	240*	9.5	3	40A	8awg	0.3	1.5	1/2"	Bottom	—	65°	43°
MB012240T	240*	11.5	4	50A	6awg	0.3	1.5	1/2"	Bottom	—	79°	52°
MB008277T	277	8.0	2	29A	10awg	0.3	1.5	1/2"	Bottom	—	55°	36°
MB010277T	277	10.0	3	40A	8awg	0.3	1.5	1/2"	Bottom	—	68°	46°

PRODUCT DIAGRAM (in Inches)



*240V units can be used on 208V with 25% reduced temperature output.

SUGGESTED SPECIFICATION

Tankless Water Heater shall be an Eemax Thermostatic Model, with digital microprocessing temperature control capable of maintaining outlet temperature of +/- 1°F accuracy, and uses an ASSE 1070 approved integrated mixing valve.

_____, with _____ kW, _____ vac, and _____ to heat _____ GPM @ a
MODEL # / kW RATING / VOLTAGE / AMPERAGE

temperature rise of ___ degrees F. Unit shall have ABS-UL 94Vo rated cover. Element shall be replaceable cartridge insert. Unit shall have replaceable filter in the inlet connector. Element shall be iron free, Nickel Chrome material. Heater shall be fitted with 1/2" pipe compression nuts (5/8" OD) or 3/8" sleeves, to eliminate need for soldering. Maximum operating pressure of 150 PSI. Hot water storage tanks prohibited. Unit shall be Eemax or approved equal.

EEMAX SUBMITTAL

Engineer/Architect: _____
Job Name/Customer: _____
Location: _____
Contractor: _____
Representative: _____

HEATER SPECIFICATIONS:	Quantity	kW	Voltage	AMPS	GPM
AccuMix Model # MB					
AccuMix Model # MT					

PRODUCT SPECIFICATIONS:

Dimensions:	13.5" H x 5" W x 4" D
Weight:	8 lbs.
Cover:	Steel Powder Coated
Color:	Sandstone
Temperature:	Factory set to 105°F
Element:	Replaceable Ni Chrome cartridge insert
MT Fittings:	3/8" compression fittings at TOP of unit
MB Fittings:	1/2" compression fittings at BOTTOM of unit
UL Listed:	E86667

U.S. PATENT PENDING TECHNOLOGY

WARNING: THE TEMPERATURE OF THIS HEATER HAS BEEN EEMAX FACTORY SET AT 105°F FOR HAND WASHING APPLICATIONS AND MUST NOT BE ADJUSTED. TAMPERING WITH ANY ADJUSTMENTS WILL VOID WARRANTY AND MAY CAUSE A LOSS OF COMPLIANCE TO UNIFORM PLUMBING CODE 413.1. FOR FURTHER INFORMATION PLEASE CONTACT OUR TECHNICAL SUPPORT DEPARTMENT AT **1-800-543-6163.**

SPECIAL DESIGN SERVICE
INQUIRIES FOR UNITS FOR UNIQUE APPLICATIONS ARE WELCOME.
CALL OUR TECHNICAL SERVICE DEPT. **1-800-543-6163.**

Eemax
Hot Water Solutions Made Easy

353 Christian Street, Oxford, CT 06478
(800) 543-6163 info@eemaxinc.com
eemax.com

NO LEAD

* This wetted surface of this product contacted by water contains less than 0.25% lead and meets California and Vermont Lead Free laws.

EM09001-16

431.13
06/21/2006
Rev. 05

VENDOR DATA
TRANSMITTAL & DISPOSITION FORM

31055-503528-140.1 — To be completed by Supplier/Subcontractor

Purchase Order or Subcontract Number: 00121414 — Project Title/Number: RHLLW:1858 Administration Building Spec / 31055

Submittal Number: CH-Adm-144-01 — Supplier/Subcontractor Name: AREVA Federal Services

Submittal Date: 11/11/15 — Address: 2070 West Broadway, Idaho Falls ID, 83402

VDS Item No.	VDT Item No.	Specification/ Drawing Reference	Tag Number	Submittal Status	Revision Level	Supplier/ Subcontractor Document Number (if applicable)	Description	VDR Number	Disp Code
140	01	1858-221116	NA	IO	0	CH-Adm-144-01	Water Meter Product Data	VDR-529787	D

Remarks

Julethia Hawthorn — Digitally signed by HAWTHORN Julethia
Date: 2015.11.11 11:27:10 -05'00'

Supplier/Subcontractor Authorized Signature / Date

To Be Completed by Contractor/AE

Cindy Dabb — 02/02/2016

Authorized Signature / Date

Vendor Data Review System Final Disposition Screen

This vendor data item has been given the following disposition codes

Reviewer	Revision Level	Date	Disposition Code	Comments
AUSTAD, STEPHANIE L	0	02-FEB-16	D	

Final Disposition: D

VDR Number:	VDR-529787
Revision Level:	0
Project Number:	31055 - 503528
Transmittal Number:	31055-503528-140.1
Transmittal Status:	Information Only
Line Item:	1
Review Remarks:	

Disposition Code::	By::	Final Comments::
D	Austad, Stephanie Lee	

AREVA

AREVA Federal Services LLC

DATA TRANSMITTAL FORM

Supplier: C&H Construction/Intermech	**DTF No:** CH/ADM-144-01		Page 1 of 1
P.O./SC No: 15C3011496		**Date:**	10/14/15
Type of Submittal: ☒ First ☐ Re-Submittal		**SDRL List Item No:**	ADM-144
Submitted for: ☒ Approval ☐ Review ☐ Information		***Number of Copies Submitted:***	1
Submitted By: Shelly Furukawa (Name)	(Signature)		Document Control (Title)

ITEM NUMBER	DOCUMENT NUMBER	REVISION NUMBER	DOCUMENT DESCRIPTION	AFS DISPOSITION
01	221116	n/a	Water Meter Product Data	☐ AP ☒ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
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				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA

Comments: Contractor to ensure water meter is provided with a factory extended low-flow rate capability. Contractor is to provide matching flanges for attachment to the domestic water system. See drawing P-8.

Technical Reviewer (i.e., RE, PTL, SME, QA, etc.)

Date 10-20-2015

AFS DISPOSITION CODES AND DEFINITIONS			
AP	Approved	Work may proceed.	Resubmittal is not required
AWC	Approved with Comment	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
REV	Reviewed	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
RWC	Reviewed with Comment	Work may proceed; **subject to incorporation and compliance w/ Buyer comments.**	**Correct and resubmit**
DS	Disapproved	**Work may not proceed.**	**Correct and resubmit**
RSA	Receipt Submittal Acknowledged	No other action required.	

If, in the judgment of the Supplier, the incorporation of AFS' comments will result in a change to the Purchase Order/Subcontract, work shall not proceed and the Supplier shall immediately provide a written notice to AFS' C&P Representative describing the change.

Project Manager (PM) / Engineering Manager (EM) or Designated Individual (DI) Approval ML Sanger — *Date:* 10/21/15

MARK L SANGER

AFS-EN-FRM-023 Rev 01 (Effective August 18, 2014)
Refer to AFS-EN-PRC-012

AdM-144

Badger Meter

E-Series® Ultrasonic Meter

Cold Water Stainless Steel Meter, 1-1/2" and 2"
NSF/ANSI Standard 61 Certified, Annex G

DESCRIPTION

The E-Series® Ultrasonic meter uses solid-state technology in a compact, totally encapsulated, weatherproof, and UV-resistant housing, suitable for residential and commercial applications. Electronic metering provides information—such as rate of flow and reverse flow indication—and data not typically available through traditional, mechanical meters and registers. Electronic metering eliminates measurement errors due to sand, suspended particles and pressure fluctuations.

The Ultrasonic 1-1/2" and 2" meters feature:

- Minimum extended low-flow rate lower than typical positive displacement meters.
- Simplified one-piece electronic meter and register that are integral to the meter body and virtually maintenance free.
- Sealed, non-removable, tamper-protected meter and register.
- Easy-to-read, 9-digit LCD display presents consumption, rate of flow, reverse-flow indication, and alarms.
- High resolution industry standard ASCII encoder protocol.

The Ultrasonic meter is available with a wired lead, in-line connector or fully prewired to AMR/AMI devices.

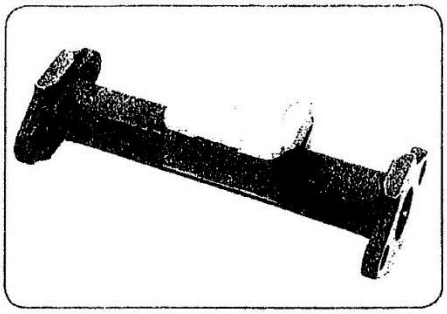
APPLICATIONS

Use the Ultrasonic meter for measuring potable cold water in residential, commercial and industrial services. The meter is also ideal for non-potable, reclaimed irrigation water applications or less than optimum water conditions where small particles exist.

The Ultrasonic meter complies with applicable portions of ANSI/AWWA Standard C700 and NSF/ANSI Standard 61, Annex G. There is currently no AWWA standard that specifically addresses ultrasonic meters for residential applications.

OPERATION & PERFORMANCE

As water flows into the measuring tube, ultrasonic signals are sent consecutively in forward and reverse directions of flow. Velocity is then determined by measuring the time difference between the measurement in the forward and reverse directions. Total volume is calculated from the measured flow velocity using water temperature and pipe diameter. The LCD display shows total volume and alarm conditions and can toggle to display rate of flow.



In the normal temperature range of 45…85° F (7…29° C), the Ultrasonic "new meter" consumption measurement is accurate to:

- ±1.5% over the normal flow range
- ±3.0% from the extended low flow range to the minimum flow value

CONSTRUCTION

E-Series Ultrasonic meters feature a stainless steel, lead-free meter housing, an engineered polymer and stainless steel metering insert, a meter-control circuit board with associated wiring, LCD, and battery. Wetted elements are limited to the pressure vessel, the polymer/stainless steel metering insert and the transducers. The electronic components are housed and fully potted within a molded, engineered polymer enclosure, which is permanently attached to the meter housing. The transducers extend through the stainless steel housing and are sealed by O-rings.

The metering insert holds the stainless steel ultrasonic reflectors in the center of the flow area, enabling turbulence-free water flow through the tube and around the ultrasonic signal reflectors. The metering insert's patented design virtually eliminates chemical buildup on the reflectors, ensuring long-term metering accuracy.

METER INSTALLATION

The meter is completely submersible and can be installed using horizontal or vertical piping, with flow in the up direction. The meter will not measure flow when an "empty pipe" condition is experienced. An empty pipe is defined as a condition when the flow sensors are not fully submerged.

ESM-DS-00672-EN-04 (June 2014)

Product Data Sheet

SPECIFICATIONS

E-Series Ultrasonic Meter Size	1-1/2" (40 mm)	2" (50 mm)
Operating Range	1.25…100 gpm	1.5…160 gpm
Extended Low-Flow Rate	0.40 gpm	0.50 gpm
Maximum Continuous Operation	100 gpm	160 gpm
Pressure Loss at Maximum Flow	3.8 psi	5.2 psi
Reverse Flow – Maximum Rate	12 gpm	18 gpm
Operating Performance	In the normal temperature range of 45…85° F (7…29° C), new meter consumption measurement is accurate to: • ±1.5% over the normal flow range • ±3.0% from the extended low flow range to the minimum flow value	
Storage Temperature	– 40…140° F (– 40…60° C)	
Maximum Ambient Storage (Storage for One Hour)	150° F (72° C)	
Measured-Fluid Temperature Range	34…140° F (1…60° C)	
Humidity	0…100% condensing; meter is capable of operating in fully submerged environments	
Maximum Operating Pressure of Meter Housing	175 psi (12 bar)	
Register Type	Straight reading, permanently sealed electronic LCD; digits are 0.28" (7 mm) high	
Register Display	• Consumption (up to nine digits) • Rate of flow • Alarms • Unit of measure factory programmed for gallons, cubic feet and cubic meters	
Register Capacity	• 100,000,000 gallons • 10,000,000 cubic feet • 1,000,000 cubic meters	
Totalization Display Resolution	• Gallons: 0.X • Cubic feet: 0.XX • Cubic meters: 0.XXX	
Battery	3.6-volt lithium thionyl chloride; battery is fully encapsulated within the register housing and is not replaceable; 20-year battery life	

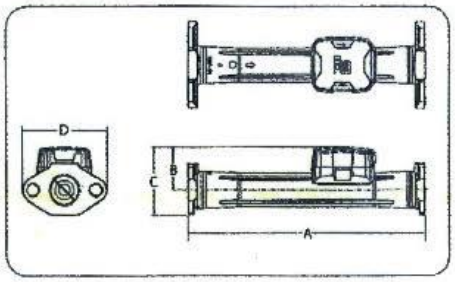
MATERIALS

Meter Housing	316 stainless steel
Measuring Element	Pair of ultrasonic sensors located in the flow tube
Register Housing & Lid	Engineered polymer
Metering Insert	Engineered polymer & stainless steel
Transducers	Piezo-ceramic device with wetted surface of stainless CrNiMo

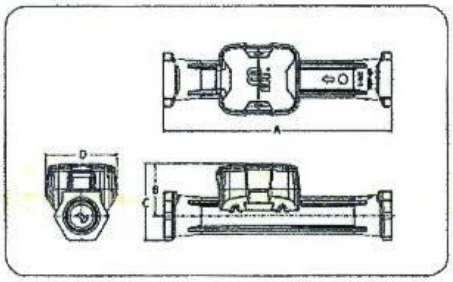
PHYSICAL DIMENSIONS

E-Series Ultrasonic Meter Size	1-1/2" (40 mm)	1-1/2" (40 mm)	2" (50 mm)	2" (50 mm)
Housing	Elliptical	HEX	Elliptical	HEX
Size Designation X Lay Length	1-1/2" x 13"	1-1/2" x 12.62"	2" x 17"	2" x 15.25"
Weight (without AMR)	8.2 lb	6.5 lb	11.9 lb	8.9 lb
See illustration below for Measurement Designations.				
Length (A)	13"	12.62"	17"	15.25"
Height (B)	2.80"	2.84"	3.01"	3.06"
Height (C)	4.55"	4.15"	4.76"	4.68"
Width (D)	5.50"	3.90"	6.08"	3.90"
Bore Size	1-1/2"	1-1/2"	2"	2"
Two-Bolt Elliptical Flange (AWWA)	1-1/2"	—	2"	—
Companion Flange	1-1/2"	—	2"	—
Internal Thread Size	—	1-1/2" NPT	—	2" NPT

Elliptical Measurement Designations

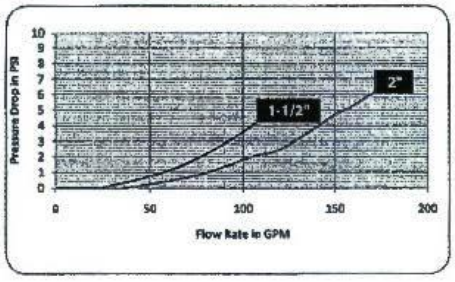


HEX Measurement Designations



PRESSURE LOSS CHART

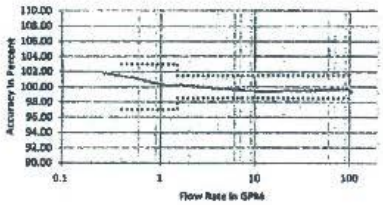
Rate of Flow in Gallons per Minute (gpm)



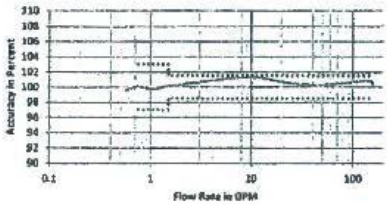
ACCURACY CHARTS

Rate of Flow in Gallons per Minute (gpm)

1-1/2" Meter



2" Meter



Making Water Visible®

www.badgermeter.com

The Americas | Badger Meter | 4545 West Brown Deer Rd | PO Box 245036 | Milwaukee, WI 53224-9536 | 800-876-3837 | 414-355-0400
México | Badger Meter de las Americas, S.A. de C.V. | Pedro Luis Ogazón N°32 | Esq. Angelina N°24 | Colonia Guadalupe Inn | CP 01050 | México, DF | México | +52-55-5662-0882
Europe, Middle East and Africa | Badger Meter Europa GmbH | Nurtingen Str 76 | 72639 Neuffen | Germany | +49-7025-9208-0
Europe, Middle East Branch Office | Badger Meter Europe | PO Box 341442 | Dubai Silicon Oasis, Head Quarter Building, Wing C, Office #C209 | Dubai | UAE | +971-4-371 2503
Czech Republic | Badger Meter Czech Republic s.r.o. | Modřanská 2082/26 | 621 00 Brno, Czech Republic | +420-5-41420411
Slovakia | Badger Meter Slovakia s.r.o. | Račianska 109/B | 831 02 Bratislava, Slovakia | +421-2-44 63 83 01
Asia Pacific | Badger Meter | 80 Marine Parade Rd | 21-04 Parkway Parade | Singapore 449269 | +65-63464836
China | Badger Meter | 7-1202 | 99 Hangzhong Road | Minhang District | Shanghai, China 201101 | +86-21-5763 5412

Legacy Document Number: ESM-T-10-BM

VENDOR DATA
TRANSMITTAL & DISPOSITION FORM

31055-503528-134.1

To be completed by Supplier/Subcontractor

Purchase Order or Subcontract Number: 00121414

Project Title/Number: RHLLW:1858 Administration Building Spec / 31055

Submittal Number: CH-Adm-134

Supplier/Subcontractor Name: AREVA Federal Services

Submittal Date: 08/31/16

Address: 2070 West Broadway, Idaho Falls ID, 83402

VDS Item No.	VDT Item No.	Specification/ Drawing Reference	Tag Number	Submittal Status	Revision Level	Supplier/ Subcontractor Document Number (if applicable)	Description	VDR Number	Disp Code
134	01	1858-220523.12	NA	IO	0	CH-Adm-134	Certification for Valves Compliance	561571	D

Remarks

Julethia Hawthorn

Digitally signed by HAWTHORN Julethia
Date: 2016.08.31 08:56:02 -04'00'

Supplier/Subcontractor Authorized Signature / Date

To Be Completed by Contractor/AE

Cindy Dabb

09/07/2016

Authorized Signature / Date

Vendor Data Review System Final Disposition Screen

This vendor data item has been given the following disposition codes

Reviewer	Revision Level	Date	Disposition Code	Comments
AUSTAD, STEPHANIE L	0	06-SEP-16	D	
RICHARDS, STEVEN C	0	31-AUG-16	D	

Final Disposition: D

VDR Number:	VDR-561571
Revision Level:	0
Project Number:	31055 - 503528
Transmittal Number:	31055-503528-134.1
Transmittal Status:	Information Only
Line Item:	1
Review Remarks:	

Disposition Code::	By::	Final Comments::
D	Austad, Stephanie Lee	

AREVA

AREVA Federal Services LLC

DATA TRANSMITTAL FORM

Supplier:	C & H Construction Company, Inc.	**DTF No:**	CH-ADM-134	Page 1 of 1	
P.O./SC No:	15C3011496			**Date:**	7/5/16
Type of Submittal:	☒ First	☐ Re-Submittal		**SDRL List Item No:**	ADM-134
Submitted for:	☒ *Approval* ☐ *Review* ☐ *Information*			***Number of Copies Submitted:*** ***1***	
Submitted By:	Shelly Furukawa	[signature]		Document Control	
	(Name)	**(Signature)**		**(Title)**	

ITEM NUMBER	DOCUMENT NUMBER	REVISION NUMBER	DOCUMENT DESCRIPTION	AFS DISPOSITION
01	220523.12	n/a	Certification for Valves Compliance	☒ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA

Comments: No Comments

Technical Reviewer (i.e., RE, PTL, SME, QA, etc.) [signature]

Date 7/11/2016

AFS DISPOSITION CODES AND DEFINITIONS			
AP	Approved	Work may proceed.	Resubmittal is not required
AWC	Approved with Comment	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
REV	Reviewed	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
RWC	Reviewed with Comment	Work may proceed: **subject to incorporation and compliance w/ Buyer comments.**	**Correct and resubmit**
DS	Disapproved	**Work may not proceed.**	**Correct and resubmit**
RSA	Receipt Submittal Acknowledged	No other action required.	

If, in the judgment of the Supplier, the incorporation of AFS' comments will result in a change to the Purchase Order/Subcontract, work shall not proceed and the Supplier shall immediately provide a written notice to AFS' C&P Representative describing the change.

Project Manager (PM) / Engineering Manager (EM) or Designated Individual (DI) Approval Digitally signed by BROUGHTON Ronnie Date: 2016.07.12 14:26:29 -04'00' ***Date:***

AFS-EN-FRM-023 Rev 01 (Effective August 18, 2014)
Refer to AFS-EN-PRC-012

"Apollo" INTERNATIONAL

SUBMITTAL SHEET

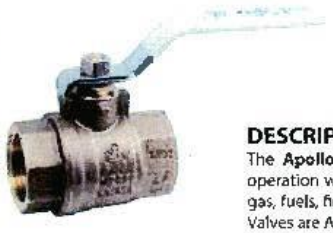
LEAD FREE

94ALF-A Series

NEW

Full Port Brass **Ball Valve**

Job Name:	
Job Location:	
Engineer:	
Contractor:	
Tag:	
PO Number:	
Representative:	
Wholesale Distributor:	



DESCRIPTION

The **Apollo International™** 94ALF-A Lead Free* forged brass ball valves combine reliable operation with maximum economy. Now with multi-agency approvals, the 94ALF-A is ideal for gas, fuels, fire protection and general plumbing and HVAC applications including potable water. Valves are ANSI 3rd party Lead Free* certified.

FEATURES

- Lead Free* materials and certification
- Distinctive white "Lead Free" handle grip and blue "Lead Free" hang tag
- 2-Piece, Full-Port design
- Blow-out Proof Stem
- Adjustable Stem Packing Nut
- Multiple agency approvals

PERFORMANCE RATING

- Valve Design Rating:
  600 CWP – 1/4 to 2"
  400 CWP – 2-1/2" to 4"
- Temperature Range: -20°F to 366°F

APPROVALS

- MSS SP-110 - Ball Valves...
- NSF/ANSI 61-8, Annex F & G
- NSF/ANSI 372 Lead Free
- IAPMO IGC 157 (cUPC)
- ANSI Z21.15 (½ psi) (CSA 9.1) (1/4" – 2")
- ASME B16.44 (5 psi) (CR91-002) (1/4" – 2")
- ASME B16.33 (125 psi) (CGA 3.16) (1/2" – 2")
- **UL:** Guides YQNZ, YRBX, YRPV, YSDT (1/2" - 4") & MHKZ (1/4" - 4" NPT only)
- UL 258 – VQGU Trim & Drain 175# max (1/4" – 2")
- FM 1140 (1/4" - 2" NPT & Solder)

Note: Gas approvals apply to NPT valves only

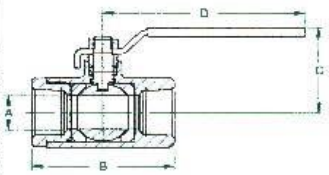
STANDARD MATERIALS LIST

Part Name	Material
Body	Lead Free Brass (DZR)
Retainer	Lead Free Brass (DZR)
Ball 1/4" - 1"	Lead Free Brass (DZR), Chr. Plated
Ball 1-1/4" - 4"	SS Type 316
Stem	Brass C36000
Seats	PTFE
Stem Packing	PTFE
Gland Nut	Brass, C37700
Seal	PTFE
Handle	Steel, plated (with PVC grip)
Handle Nut	Steel, plated

DIMENSIONS

Part Number	Size (in.)	Dimensions (in.) A	B	C	D	E	Wt. (lbs.)	Options 2-1/4" Stem Extension Kit	Options Replacement Lever Handles
NPT									
94ALF-101-01A	1/4"	0.39	1.76	1.73	3.54	-	0.29	78217101	W234700
94ALF-102-01A	3/8"	0.39	1.76	1.73	3.54	-	0.30		
94ALF-103-01A	1/2"	0.58	2.05	2.04	3.54	-	0.44	78217201	W234800
94ALF-104-01A	3/4"	0.75	2.36	2.26	3.78	-	0.71	78217301	W234900
94ALF-105-01A	1"	0.95	2.76	2.58	4.53	-	1.10	78217401	W235000
94ALF-106-01A	1-1/4"	1.26	3.31	3.05	4.53	-	1.63	78217501	W235100
94ALF-107-01A	1-1/2"	1.58	3.66	3.37	5.51	-	2.41	78217601	W235200
94ALF-108-01A	2"	1.97	4.18	3.70	6.30	-	3.66		W283000
94ALF-109-01A	2-1/2"	2.52	5.38	4.65	8.66	-	7.60	78217701	W235300
94ALF-100-01A	3"	2.91	6.04	4.97	8.66	-	9.60		
94ALF-10A-01A	4"	3.90	7.39	6.13	11.02	-	23.00	78217801	W273800

NPT x NPT



** LEAD FREE: The wetted surfaces of this product shall contain no more than 0.25% lead by weighted average. Complies with Federal Public Law 111-380. ANSI 3rd party approved and listed.*

Apollo Valves / **Conbraco Industries, Inc.**
701 Matthews Mint Hill Road, Matthews, NC 28105 USA
www.**apollovalves**.com | (704) 841-6000

AALBERTS INDUSTRIES

'Apollo' Valves

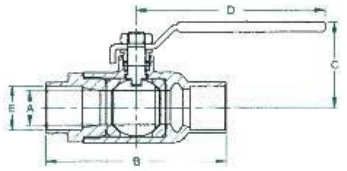
SUBMITTAL SHEET

LEAD FREE

94ALF-A Series

Full Port Brass **Ball Valve**

Solder x Solder



DIMENSIONS

Part Number	Size (in.)	Dimensions (in.)					Wt. (lbs.)	Options	Options
		A	B	C	D	E		2-1/4" Stem Extension Kit	Replacement Lever Handles
SOLDER									
94ALF-203-01A	1/2"	0.58	2.05	1.84	3.54	0.63	0.40	78217201	W234800
94ALF-204-01A	3/4"	0.75	2.75	2.14	3.78	0.88	0.68	78217301	W234900
94ALF-205-01A	1"	0.95	3.31	2.45	4.53	1.13	1.15	78217401	W235000
94ALF-206-01A	1 1/4"	1.26	3.82	3.04	4.53	1.38	1.53	78217501	W235100
94ALF-207-01A	1-1/2"	1.58	4.43	3.17	5.51	1.63	2.31	78217601	W235200
94ALF-208-01A	2"	1.97	5.38	3.49	6.30	2.13	3.77		W283000
94ALF-209-01A	2-1/2"	2.52	6.28	4.66	8.66	2.63	6.79	78217701	W235300
94ALF-200-01A	3"	2.91	7.15	4.87	8.66	3.13	8.67		
94ALF-20A-01A	4"	3.90	9.28	5.87	11.02	4.13	16.67	78217801	W273800

Apollo Valves, Manufactured by **Conbraco Industries, Inc.**
701 Matthews Mint-Hill Road, Matthews, NC 28105 USA
www.**apollovalves**.com | (704) 841-6000

AALBERTS INDUSTRIES

VENDOR DATA
TRANSMITTAL & DISPOSITION FORM

31055-503528-130.1 — To be completed by Supplier/Subcontractor

Purchase Order or Subcontract Number: 00121414 — Project Title/Number: RHLLW:1858 Administration Building Spec / 31055

Submittal Number: CH-Adm-130 — Supplier/Subcontractor Name: AREVA Federal Services

Submittal Date: 08/31/16 — Address: 2070 West Broadway, Idaho Falls ID, 83402

VDS Item No.	VDT Item No.	Specification/ Drawing Reference	Tag Number	Submittal Status	Revision Level	Supplier/ Subcontractor Document Number (if applicable)	Description	VDR Number	Disp Code
130	01	1858-220519	NA	IO	0	CH-Adm-130	Product Data Compliance for Gauges	561542	D

Remarks

Julethia Hawthorn — Digitally signed by HAWTHORN Julethia
Date: 2016.08.31 08:14:40 -04'00'

Supplier/Subcontractor Authorized Signature / Date

To Be Completed by Contractor/AE

Cindy Dabb — 09/06/2016

Authorized Signature / Date

Vendor Data Review System Final Disposition Screen

This vendor data item has been given the following disposition codes

Reviewer	Revision Level	Date	Disposition Code	Comments
RICHARDS, STEVEN C	0	31-AUG-16	D	
AUSTAD, STEPHANIE L	0	06-SEP-16	D	

Final Disposition: D

VDR Number:	VDR-561542
Revision Level:	0
Project Number:	31055 - 503528
Transmittal Number:	31055-503528-130.1
Transmittal Status:	Information Only
Line Item:	1
Review Remarks:	

Disposition Code::	By::	Final Comments::
D	Austad, Stephanie Lee	

AREVA

AREVA Federal Services LLC

DATA TRANSMITTAL FORM

Supplier:	C & H Construction Company, Inc.	**DTF No:**	CH ADM-130	Page 1 of 1
P.O./SC No:	15C3011496		**Date:**	6/29/16
Type of Submittal:	☒ First ☐ Re-Submittal		**SDRL List Item No:**	ADM-130
Submitted for:	☒ *Approval* ☐ *Review* ☐ *Information*		***Number of Copies Submitted***	***1***
Submitted By:	Shelly Furukawa	Shelly Furukawa		Document Control
	(Name)	**(Signature)**		**(Title)**

ITEM NUMBER	DOCUMENT NUMBER	REVISION NUMBER	DOCUMENT DESCRIPTION	AFS DISPOSITION
01	220519	n/a	Gauges Product Data Compliance	☒ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA
				☐ AP ☐ AWC ☐ REV ☐ RWC ☐ DS ☐ RSA

Comments: No Comments

Technical Reviewer (i.e., RE, PTL, SME, QA, etc.)

Date 7/1/2016

AFS DISPOSITION CODES AND DEFINITIONS			
AP	Approved	Work may proceed.	Resubmittal is not required
AWC	Approved with Comment	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
REV	Reviewed	Work may proceed; comments provided for Supplier's consideration only.	Resubmittal is not required
RWC	Reviewed with Comment	Work may proceed; **subject to incorporation and compliance w/ Buyer comments.**	**Correct and resubmit**
DS	Disapproved	**Work may not proceed.**	**Correct and resubmit**
RSA	Receipt Submittal Acknowledged	No other action required.	

If, in the judgment of the Supplier, the incorporation of AFS' comments will result in a change to the Purchase Order/Subcontract, work shall not proceed and the Supplier shall immediately provide a written notice to AFS' C&P Representative describing the change.

Project Manager (PM) / Engineering Manager (EM) or Designated Individual (DI) Approval

Digitally signed by BROUGHTON Ronnie
Date: 2016.07.05 08:14:33 -04'00'

Date:

AFS-EN-FRM-023 Rev 01 (Effective August 18, 2014)
Refer to AFS-EN-PRC-012

ACUREN

Quality people
Innovative technology
Outstanding service

Acuren

277 South Street
Rochester, Michigan 48307
Phone: (248) 651-0770
Fax: (248) 651-0882

The following products from the H O Trerice Co. were tested by Acuren and found to be Lead Free as defined by the federal Safe Drinking Water Act as amended by the "Reduction of Lead in Drinking Water Act", as well as the following state statutes: California Health and Safety Code Section 116875 "Lead Materials", Vermont Act No. 193 "Lead in Consumer Products Law" and Maryland House Bill 372, "Business Occupations and Professions – Plumbers – Lead-Free Materials".

500XB	500XB Brass Pressure Gauges
600CB	600CB Brass Pressure Gauges
610CB	610CB Brass Pressure Gauges
620B	620B Brass Pressure Gauges
700B	700B Brass Pressure Gauges
800B	800B Brass Pressure Gauges
D82LFB	D82LFB Brass Pressure Gauges
HT3041	Brass Stem Hydro Therm
3-3C2PBF	Brass Econo Wells
3-4F2PBF	Brass Indusrial Thermometer Wells
7-3D2PBF	Brass Dial Wells
76-4D2PBF	Brass Bimetal Wells
865MFGPBF	Brass Gauge Cocks
866PBF	Brass Ball Valves
870-1PBF	Brass Impulse Dampeners
872-1PBF	Brass Snubbers
D3741PBF	Brass Test Plugs and Extensions

Component list and test results attached.

Don Flett	Don Flett	12/5/14
Technician Name	**Signature**	**Date**

ACUREN

277 South Street, Rochester, MI 48307 USA • Phone: (248) 651-0770 • Fax: (248) 651-0770
Materials, Engineering & Testing - A Rockwood Company

POSITIVE MATERIAL IDENTIFICATION (PMI) INSPECTION REPORT

Customer:	H.O. TRERICE	**Material Spec:**	N/A	**P No:**	N/A
Customer PO#:	SEE BELOW	**UNS No:**	N/A	**Product Form:**	Finished
Customer Job No:	N/A	**Equipment Model No:**	XL3t	**Equipment SN:**	32359
Job Location:	PERFORMED AT DETROIT FACILITY	**Source Type:**	☐ Fe55 ☐ Cd109 ☒ Other: Tube		
Job / Part Description:	SEE BELOW				
Dwg / Part No:	SEE BELOW	**mCi Content:**	N/A		
Test No:	N/A	**Cal. Standard:**	N/A		
Heat / Lot No:	N/A	**Equipment Cal Date:**	12/5/14		

Test Results

Part Number	Name	PO or WO Number	Time	Type	Alloy1	Sn	Pb	Zn	Cu
620B	BASE PRESSURE GAUGE	424022	12/5/2014 9:59	ALLOY	C280Muntz : *2.54	< LOD	0.152	41.802	57.994
620B	RING PRESSURE GAUGE	424022	12/5/2014 10:00	ALLOY	C510PBzA : *2.40	6.583	< LOD	0.436	92.912
700B	BASE PRESSURE GAUGE	423563	12/5/2014 10:02	ALLOY	C280Muntz : 0.00	< LOD	< LOD	38.976	60.957
700B	RING PRESSURE GAUGE	423563	12/5/2014 10:03	ALLOY	C510PBzA : *2.65	3.51	< LOD	0.488	95.889
800B	BASE PRESSURE GAUGE	423468	12/5/2014 10:04	ALLOY	C280Muntz : 0.00	< LOD	< LOD	39.567	60.007
800B	RING PRESSURE GAUGE	423468	12/5/2014 10:05	ALLOY	C510PBzA : *3.93	3.609	< LOD	1.649	94.336
D82LFB	PRESSURE GAUGE	423468	12/5/2014 10:06	ALLOY	C280Muntz : 1.19	0.32	< LOD	37.462	61.587
600CB	BASE PRESSURE GAUGE	424628	12/5/2014 10:07	ALLOY	C280Muntz : *2.59	< LOD	0.212	41.647	58.139
600CB	RING PRESSURE GAUGE	424628	12/5/2014 10:08	ALLOY	C510PBzA : *3.59	6.964	< LOD	0.23	92.176
HT3031	HYDRO THERM	416337	12/5/2014 10:09	ALLOY	C280Muntz : *2.45	0.18	< LOD	38.096	60.221
610CB	BASE PRESSURE GAUGE	424022	12/5/2014 10:09	ALLOY	C280Muntz : *2.61	< LOD	0.114	41.955	57.857

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610CB	RING PRESSURE GAUGE	424022	12/5/2014 10:10	ALLOY	C510PBzA : *3.72	7.141	< LOD	< LOD	92.732
500XB	011-0035.1 BASE	423139	12/5/2014 10:11	ALLOY	C270YelBs : 0.61	0.16	< LOD	36.076	63.276
500XB	163-0185 BOURDON TUBE	420108	12/5/2014 10:11	ALLOY	C524PBz : *2.44	8.269	< LOD	< LOD	91.729
500XB	157-0030T.P	421464	12/5/2014 10:12	ALLOY	C270YelBs : 0.00	< LOD	< LOD	31.778	67.976
3-3C2PBF	ECONO WELL	423501	12/5/2014 10:15	ALLOY	C687AlBs : *2.57	< LOD	< LOD	22.612	75.13
3-4F2PBF	IT WELL	423262	12/5/2014 10:16	ALLOY	C240LoBs : 0.36	< LOD	< LOD	21.585	78.313
3-4JPBF	IT WELL	420768	12/5/2014 10:17	ALLOY	C687AlBs : 1.74	< LOD	< LOD	21.758	76.096
3-4LD2PBF	IT WELL	421679	12/5/2014 10:17	ALLOY	C687AlBs : *3.03	< LOD	< LOD	23.647	74.09
76-4D2PBF	BIMETAL WELL	420777	12/5/2014 10:18	ALLOY	C464NavBs : 0.47	0.533	0.101	37.518	61.804
76-4G2PBF	BIMETAL WELL	420777	12/5/2014 10:19	ALLOY	C464NavBs : 1.04	0.554	0.16	37.446	61.512
76-4J2PBF	BIMETAL WELL	420777	12/5/2014 10:20	ALLOY	C464NavBs : 0.00	0.581	0.143	37.867	61.135
735-2PBF	NEEDLE VALVE	420763	12/5/2014 10:21	ALLOY	C857YelBs : *2.80	0.715	2.559	37.79	58.007
865MFGPBF	BASE GAUGE COCK	422190	12/5/2014 10:22	ALLOY	C464NavBs : 1.73	0.832	0.157	36.832	62.031
865MFGBF	HEAD GAUGE COCK	422190	12/5/2014 10:24	ALLOY	No Match : *4.13	< LOD	< LOD	4.773	8.416
865PBF	HEAD GAUGE COCK	422190	12/5/2014 10:25	ALLOY	C464NavBs : 0.54	0.791	0.172	37.054	61.844
865PBF	BASE GAUGE COCK	422190	12/5/2014 10:25	ALLOY	C464NavBs : 0.39	0.831	0.151	37.059	61.822
866PBF	BALL VALVE	421901	12/5/2014 10:26	ALLOY	C464NavBs : 0.04	0.671	0.151	38.29	60.561

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016-0096PBF	BODY	422226	12/5/2014 10:27	ALLOY	C240LoBs : 0.00	< LOD	0.188	19.932	79.841
085-0004PBF	INSERT	422227	12/5/2014 10:28	ALLOY	C687AlBs : 2.46	< LOD	< LOD	22.042	75.646
016-0083.1PBF	BODY	422226	12/5/2014 10:29	ALLOY	C240LoBs : 0.69	< LOD	0.077	21.48	78.378
061-0003.1	FILTER	420271	12/5/2014 10:29	ALLOY	C524PBz : 0.60	9.151	< LOD	< LOD	90.81
061-000.2	FILTER	423638	12/5/2014 10:30	ALLOY	C524PBz : 0.12	10.408	< LOD	< LOD	89.513
016-0084.1PBF	BODY	422226	12/5/2014 10:31	ALLOY	C240LoBs : 0.18	< LOD	< LOD	21.802	78.064
D3741PBF	TEST PLUG	422252	12/5/2014 10:31	ALLOY	C270YelBs : 0.09	0.152	< LOD	36.401	63.174
D3742PBF	TEST PLUG	422252	12/5/2014 10:32	ALLOY	C280Muntz : 0.00	0.178	0.116	37.513	62.134
D3749PBF	TEST PLUG EXTENSION	422252	12/5/2014 10:33	ALLOY	C280Muntz : 0.00	0.231	< LOD	37.575	62.074

Comments: We, the undersigned, certify that the statements in this record are correct and that the specimens were prepared and tested in accordance with the requirements of OI-206.
Additional Notes:

Don Flett	Don Flett	433881	12/5/14
Technician Name	Signature	Service Call No.	Date

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Appendix F

Sampling/Monitoring Procedures

1. PURPOSE/SCOPE/APPLICABILITY

1.1 Purpose

This laboratory instruction (LI) addresses activities associated with sampling public water systems at the Idaho National Laboratory (INL) Site, in accordance with state and federal regulations to ensure the health and safety of workers and the public.

1.2 Scope and Applicability

This LI encompasses the collection of samples at drinking water/production wells and distribution/manifold systems, and associated reporting requirements. This LI applies to Environmental Support and Services (ES&S) sampling personnel. ES&S Monitoring Services personnel conduct public water system sampling for bacteriological, organic, inorganic, and radiological compounds.

All active INL drinking water systems (i.e., potable water supplied to personnel) are sampled as required (see Appendix A, Table A-1). Sampling data and analytical results are managed in compliance with the applicable regulations listed in the following:

- 40 CFR 141, "National Primary Drinking Water Regulations"
- 40 CFR 142, "National Primary Drinking Water Regulations Implementation"
- 40 CFR 143, "National Secondary Drinking Water Regulations"
- Safe Drinking Water Act (42 U.S.C. § 300f et seq. [1974])
- DOE O 458.1, "Radiation Protection of the Public and the Environment"
- IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems."

Unless otherwise noted, compliance samples are collected from the distribution system at the manifold or point of entry for bacteria, lead, copper, total trihalomethanes (TTHMs), and haloacetic acids (HAA5s) are reported to the Idaho Department of Environmental Quality (DEQ). Noncompliance samples can be collected anywhere from the water system and are used for information only. Noncompliance samples are generally not reported to DEQ.

All laboratory facilities performing analyses on drinking water samples for compliance purposes shall be Idaho State certified or have reciprocity with the State of Idaho. This requirement does not apply analyses on drinking water samples for noncompliance purposes.

This activity is an operations-related task. All activity and facility hazards are mitigated by the training or qualification of the performer. This LI is restricted to personnel who are trained to the hazard controls listed in this LI and LI-355, "Working in Environmental Monitoring Services Sample Preparation Areas (SPA)."

Radiological, bacteriological, State of Idaho required bacteriological, and volatile organic compound (VOC) drinking water sampling locations and schedules are included in Appendix A, Table A-2, Table A-3, Table A-4, and Table A-5, respectively. Appendix B shows maps of INL facilities where sample points are located. Appendix C contains the bacteriological detection notification and disinfection process that is implemented at INL if *coliform bacterium* is detected at an INL facility as a result of routine compliance sampling. The DEQ website contains template forms for public notices at http://deq.idaho.gov/water-quality/drinking-water/pws-monitoring-reporting/public-notifications/.

2. RISK AND CONTROLS

Sequence of Basic Activities	Potential Hazard	Hazard Control
Travel to work area and back	Vehicle operations	All vehicle occupants wear seatbelts. Have current driver's license. Drive with headlights on. Have shovel and first aid kit in vehicle. Carry cell phone or radio. Use caution when getting in/out of vehicle. Do not use a cell phone while driving, or use hands-free mode.
	Road conditions	Be aware of road conditions; ice/snow on road, road construction, etc. Drive for current weather conditions.
Exit vehicle	Slips, trips, and falls	Wear appropriate footwear. Be aware of uneven surfaces and walkways.

Sequence of Basic Activities	Potential Hazard	Hazard Control
	Biological (e.g., mice, snakes, and spiders)	Have first aid kit in all vehicles.
	Heat and cold stress	Wear proper dress. For outdoors, apply sunscreen as needed.
Collect samples	Water on floor	Maintain awareness of floor surfaces for slips, trips, and falls. Walk with caution.
	Lifting	Attend training on back safety and proper lifting methods. Cover proper lifting, stretching, and repetitive motion in pre-job briefing. Use proper lifting techniques—one person must not lift more than 50 lb or one-third of their body weight, whichever is less.
	Noisy machinery (e.g., pumps and motors)	Wear hearing protection where posted and required.
	Dropping sample bottle and broken glass	Wear protective gloves (thin mil nitrile, or nitrile-coated, natural rubber, or polyvinyl chloride [PVC]) when sampling. Wear American National Standards Institute Level IV cut-resistant gloves to handle broken glass.

Sequence of Basic Activities	Potential Hazard	Hazard Control
Preserve samples in the field and at the sample preparation area (SPA)	<2.0 ml of nitric acid, hydrochloric acid (HCL), sulfuric acid, sodium hydroxide, and/or L-ascorbic acid	Wear lab coat or long sleeves; safety glasses with side shields or face shield; nitrile, latex, or PVC gloves; and closed-toe shoes. Eyewash available in the SPA. Portable eyewash bottled solution available in the field. No eating, drinking, smoking, or chewing.
Disinfect	Bleach solution	Wear safety glasses with side shields and nonpowdered nitrile or latex gloves. Attend safety training or meeting on chemicals.
Handle, store, and ship samples	Lifting coolers	Procedures and training. Use proper lifting techniques—one person must not lift more than 50 lb or one-third of their body weight, whichever is less.
Site emergency		Have shovel in vehicle. Sign vehicle out on white board. Carry cell phone or radio.
Emergency	Personnel/worker injury	Warning Communications Center at 526-1515 or INL Site emergency at 526-7777.

2.1 Training Required

A. Battelle Energy Alliance, LLC (BEA), drinking water sampler

B. BEA sampling field worker

C. BEA SPA worker.

3. PREREQUISITES

3.1 Planning, Coordination, and Notifications

3.1.1 Before the end of each month, send an e-mail to area work control to notify them of next month's sampling activities.

3.1.2 At least 1 week before scheduled sampling activities, notify the specific water system personnel.

3.1.3 Prior to collecting samples, perform the following:

3.1.3.1 IF samples will be collected at the Advanced Test Reactor (ATR) Complex,
THEN notify the facility area supervisor or shift supervisor.

3.1.3.2 Coordinate sampling activities with well operators or mechanics at facilities to obtain appropriate access to buildings and surrounding areas.

3.1.3.3 Contact the laboratory to ensure that holding times are not exceeded (Appendix A, Table A-6) and that the laboratory can accept the samples.

3.1.3.4 Generate sample numbers and print sample labels in the SAP application, and attach sample labels to the sample bottles.

3.1.3.5 IF monthly bacteriological samples will be collected from Test Area North,
THEN call 526-6828 to coordinate Specific Manufacturing Capability (SMC) sampling and the transfer of sample chain of custody (COC).

3.2 Performance Documents

3.2.1 Review, as necessary, applicable sections of the following documents:

A. 40 CFR 141–143

B. IDAPA 58.01.08

C. GDE-9103, "Conduct of Operations Guidance for Communications"

D. PLN-8510, "Planning and Management of Environmental Support and Services Monitoring Services Activities"

E. PLN-8530, "Idaho National Laboratory Drinking Water Monitoring Plan"

F. MCP-8523, "Managing Hazardous and Non-Hazardous Samples"

G. LI-355.

3.3 Special Tools, Equipment, Parts, and Supplies

3.3.1 Use the following as needed when sampling:

A. Pre-cleaned (if required by laboratory or method) sample containers (contact analytical laboratory for correct container size and volume)

B. Sample labels from the SAP application

C. Absorbent towels

D. Pen with dark indelible ink

E. COC form, provided by the SAP application or specific laboratory COC form

F. Form 580.40, "Request for Shipment"

G. Custody seals

H. Preservative (Appendix A, Table A-6)

I. Nonpowdered nitrile or latex gloves for collecting samples and adding preservatives

J. Watch or equivalent timing device

K. Scissors and pliers

L. Hearing protection

M. Teflon™ or glass beakers

N. Blue ice or ice in double-bagged plastic bags

O. Coolers

P. Organic-free water

Q. Household bleach (sodium hypochlorite) solution (nine parts water to one part bleach) prepared at the SPA

R. Spray bottle for chlorine solution

S. Chlorine field test kit

T. Personal protective equipment listed in this LI and LI-355

U. Pipette with disposable pipette tips

V. Ziploc bags

W. Packing material for sample protection during shipment

X. Pliers to remove faucet aerator

Y. Chlorine test strips

Z. Wide scotch tape

AA. Panasonic Toughbook laptop computer

BB. DW field application (Microsoft [MS] Visual Studio DW application)

CC. Laptop computer

DD. Tooth brush.

3.4 Field Preparations

3.4.1 IF VOC samples will be collected.
THEN perform the following:

3.4.1.1 Prepare the trip blank(s) for VOC analysis (Appendix D).

3.4.1.2 Keep the trip blank(s) with the samples at all times.

3.4.2 Fill out Form 580.40 for shipping the samples before noon on the day of sampling.

3.4.3 IF performing preservation,
THEN perform the following:

3.4.3.1 Wear a lab coat or long sleeves; safety glasses with side shields, or goggles; nonpowdered, thin mil nitrile, nitrile-coated, natural rubber, or PVC gloves; and close-toed shoes to perform preservation.

3.4.3.2 IF performing preservation in the SPA,
THEN ensure an eyewash is available in the SPA.

3.4.3.3 IF performing preservation in the field,
THEN ensure portable eyewash bottled solution is available in the field.

3.4.4 IF bacteriological samples will be collected,
THEN use bottles from the laboratory that have been pre-preserved with sodium thio-sulfate.

3.4.5 IF VOC, including TTHMs and HAA5, samples will be collected from chlorinated water systems,
THEN use bottles from the laboratory that have been preserved with ascorbic acid or equivalent.

WARNING

Household bleach (sodium hypochlorite) is a strong eye, skin, and mucous membrane irritant. The extent of irritation depends on the concentration of bleach and the duration of exposure.

3.4.6 Before preparing the household bleach (sodium hypochlorite), don chemical splash goggles or safety glasses with side shields and nonpowdered nitrile or latex gloves.

3.4.7 Prepare the household bleach (sodium hypochlorite) solution as follows:

3.4.7.1 Add one part household bleach solution to nine parts of water in a spray bottle before sampling.

3.4.7.2 Using a chlorine strip, test the household bleach concentration to ensure the concentration is >50 ppm. If the concentration is <50 ppm, add more bleach.

3.5 Orientation/Training in Operating DW Field Application

NOTE: *Operation of the DW field application is addressed in Subsection 5.1.*

3.5.1 Prior to commencing field sampling activities, complete an orientation session on operating the DW field application with the Regulatory and Environmental Monitoring database administrator.

4. FACILITY CONDITIONS

None.

5. INSTRUCTIONS

5.1 Operating DW Field Application

5.1.1 Nomenclature

DW field application. The MS Visual Studio (.NET) application used on the field personal computer (PC) to record sampling information.

Electronic logbook. A feature within the SAP application to allow electronic storage of all information regarding sampling activities, approval of the completeness and correctness of the sampling information, and creation of PDF reports for submittal to records storage.

Field PC. The Panasonic Toughbook laptop computer used at the field location.

Host PC. The desktop computer used by the media lead to run the SAP application and access the file servers for storage of data files.

SAP application. The MS Access database application used by Regulatory and Monitoring Services personnel to plan and record information on field sampling activities.

5.1.2 Operating Drinking Water Electronic Logbook

5.1.2.1 On the host PC in the SAP application, create samples for a new sampling event, and print a hard-copy SAP report for reference in the field.

5.1.2.1.1 While the SAP report is open for printing, use the mouse and right click on the report (a window will open to allow exporting the samples to an Excel file).

5.1.2.2 Export the samples to an Excel file (SAP_REPORT.xls) as follows:

5.1.2.2.1 In the window that opened when clicking on the SAP report, scroll down to the EXPORT option, slide onto the right arrow, and select EXCEL.

5.1.2.2.2 In the Export window that opens, select the BROWSE button and navigate to save the default-named SAP_REPORT.xls file to the Bluetooth Exchange folder on the host PC.

5.1.2.2.3 Select OK to write the SAP_REPORT.xls file to the host PC. If a warning message about overwriting the file occurs, select YES.

5.1.2.3 Transfer the SAP_REPORT.xls file to the field PC as follows:

5.1.2.3.1 Log onto the field PC (user account name is "DW").

5.1.2.3.2 Select the field PC desktop icon 

to open the C:\DW folder.

5.1.2.3.3 Select the field PC desktop icon 

to open the Bluetooth Information Exchanger application on the field PC.

5.1.2.3.4 In the Bluetooth Information Exchanger window, select the icon 

to open a window with a list of host PCs that have Bluetooth connections defined for the field PC.

5.1.2.3.5 Select the icon corresponding to the desired host PC to access the Exchange Folder window on the host PC, which will contain the SAP_REPORT.xls file saved in Step 5.1.2.2.3.

NOTE: *An alternative to the Bluetooth Exchange "drag and drop" method is to transfer the SAP_REPORT.xls file using a jump drive.*

5.1.2.3.6 On the field PC, in the Exchange Folder window, select and "drag and drop" the SAP_REPORT.xls file into the C:\DW folder that is open on the field PC.

5.1.2.3.7 Select OK to write the SAP_REPORT.xls file to the field PC. If a warning message about overwriting the file occurs, select YES.

5.1.2.3.8 Close the Exchange folder for the host PC.

5.1.2.3.9 Close the C:\DW folder on the field PC.

5.1.2.4 Prepare to use the field PC in the field as follows:

5.1.2.4.1 Check the battery power on the field PC to see if it needs charging as follows:

NOTE: *On a Panasonic CF-30 keyboard, the blue-shaded key showing a horizontal battery with the positive terminal pointing to the left is the "F9" key. On a Panasonic CF-U1 keyboard, it is the "F" key.*

5.1.2.4.1.1 Find the keyboard blue-shaded "Fn" key and then find the blue-shaded key showing a horizontal battery with the positive terminal pointing to the left. Simultaneously hold down both keys to display the remaining battery power.

5.1.2.4.1.2 Charge the battery if battery power is low.

5.1.2.4.2 IF bacteriological samples will be collected from within SMC,
THEN ensure the utility operator (at 526-6828) is notified in advance and provided a signed-off hard copy of the bacteriological COC form.

5.1.2.5 Use the field PC during sampling to record required sampling information and save the final results file as follows:

5.1.2.5.1 Log onto the field PC (user account name is "DW").

NOTE: *The current version number of the DW field application will increase as the application is modified over time.*

5.1.2.5.2 Select the field PC desktop icon 

to open the DW field application.

NOTE: *The default event name is "BacT."*

5.1.2.5.3 In the DW field application, select the "Event" name corresponding to the sampling event that is being conducted.

NOTE 1: *There are two primary windows for the DW field application. The window that opens after selecting the "Event" name is the first window. The second window is accessed by selecting the SAMPLES button at the top of the first window. Depending on the type of sampling event (i.e., bacteriological sampling event or other event), a different window opens upon selecting the SAMPLES button as the recorded information is different. In either case, only the white-shaded fields are available for recording sampling information. The grey-shaded fields are provided to remind the sampler of relevant information from the SAP_REPORT.xls file.*

NOTE 2: *Upon completion of sampling at a location, the sampler should select the SAVE (INTERIM) button on the primary window to create a backup text file in the C:\DW directory (with a prefix of "Interim_") that contains all the information entered so far during the sampling activity.*

NOTE 3: *The PWS# information column in the Samples window is automatically entered from a stored database associated with the DW field application when the Time column is selected to fill in the time of sampling. If the public water system (PWS) number is missing, the EDIT PWS#s button should be selected and the correct PWS number entered. Upon reopening the Samples window, all the previous entered information will be retained, and when the Time column is selected for that location, the PWS number will automatically be entered. Direct access to the PWS# column is not allowed in the DW field application.*

5.1.2.5.4 Record sampling information in both DW field application windows as necessary.

NOTE: *In general, it is preferred to leave the field PC powered on for the entire duration of the sampling event. If the sampler has to either close the DW field application (if the application hangs for unknown reasons) or power down the field PC, the most recent interim saved file is used to reload the sampling information that was previously entered into the DW field application.*

5.1.2.5.5 IF restarting the DW field application during the sampling event,
THEN perform the following:

5.1.2.5.5.1 After restarting the DW field application, ensure the "Event" name is set to match the sampling activity being conducted.

5.1.2.5.5.2 Select the READ (INTERIM) command button to open a window that allows selecting "Interim_" files from the C:\DW directory that match the "Event" name.

5.1.2.5.5.3 Choose the interim file with the most recent time stamp and select OK.

NOTE: *Selecting the SAVE (FINAL) button will cause the DW field application to do some error trapping and then create a final results file in the C:\DW directory on the field PC. The results file will be date/time stamped in the file name and the file name will start with a text string that matches the "Event" name.*

5.1.2.5.6 After all required sampling information is completed in both windows, select the SAVE (FINAL) button.

5.1.2.5.7 Select the CLOSE button in the DW field application primary window to close the application.

NOTE: *The transfer process performed in Step 5.1.2.6 is similar to the transfer process performed in Step 5.1.2.3, but moves the results file in the opposite direction.*

5.1.2.6 Export the final results file from the field PC to the host PC and then to archive storage as follows:

5.1.2.6.1 On the field PC, select the desktop icon 

to open the C:\DW folder.

5.1.2.6.2 Select the desktop icon 

to open the Bluetooth Information Exchanger application on the field PC.

5.1.2.6.3 In the Bluetooth Information Exchanger window, select the icon 

to open a window with a list of host PCs that have Bluetooth connections defined for the field PC.

5.1.2.6.4 Select the icon corresponding to the desired host PC.

NOTE: *After selecting the icon corresponding to the desired host PC, a window will open that has the name of the host PC. This window is the Exchange Folder window on the host PC.*

5.1.2.6.5 On the field PC, in the C:\DW folder, select the final results file and "drag and drop" the file in the Exchange folder for the host PC.

5.1.2.6.6 Close the Exchange folder for the host PC.

5.1.2.6.7 Close the C:\DW folder on the field PC.

5.1.2.6.8 Switch to the host PC, and on the host PC desktop, select the "Shortcut to Oasis" icon to open the archive folder labeled \\fsisc1\PROJECTS\OasisMontaj\Drinking Water Program.

5.1.2.6.9 On the archived Drinking Water Program folder, select the icon for the current calendar year to open that folder.

5.1.2.6.10 On the host PC desktop, select the "Shortcut to Exchange" icon to open the Bluetooth Exchange folder.

5.1.2.6.11 Move the final results file from the Bluetooth Exchange folder to the archive folder.

5.1.2.6.12 Ensure the host PC Bluetooth Exchange folder is empty.

5.1.2.6.13 Ensure the interim and final results sampling files are deleted from the field PC C:\DW directory.

5.1.2.7 Import the final results file into the SAP application on the host PC and create a COC form as follows:

5.1.2.7.1 On the host PC in the SAP application, from the Main Menu select the IMPORT DW DATA FILE button.

5.1.2.7.2 In the window that opens, use the middle slider bar to navigate to the "Shortcut to Oasis" icon. Select that icon.

5.1.2.7.3 In the Drinking Water Program window that opens, select the icon for the current calendar year.

5.1.2.7.4 In the folder for the current calendar year, select the final results file for the current sampling event.

5.1.2.7.5 Select the OPEN button to open the Preview window and display the sampling information from the final results file.

5.1.2.7.6 In the Preview window, review the sampling information until satisfied it is correctly represented. Make revisions and additions to the data displayed in the white-shaded fields, as necessary.

5.1.2.7.7 Once satisfied with the data, select the SAVE SAMPLE INFORMATION button to load the sampling data into the data tables for the DW electronic logbook (the Preview window will close).

NOTE: *Importing the sampling data populates the date/time sample data for each sample, which allows these samples to be selected for a COC.*

5.1.2.7.8 From the SAP application Main Menu, select the VIEW/EDIT CHAIN OF CUSTODY button to open the Chain of Custody List window.

5.1.2.7.9 IF this was a bacteriological sampling event, THEN perform the following:

5.1.2.7.9.1 Check the SHOW SHIPPED COCS checkbox.

5.1.2.7.9.2 Find a previous COC form for a bacteriological sampling event to review the naming convention (e.g., "Teton Micro – 02/17/2011").

5.1.2.7.10 On the Chain of Custody List window, select the NEW COC button to open the Chain of Custody Builder window.

5.1.2.7.11 In the Chain of Custody Builder window, in the Chain of Custody area on the left side, perform the following:

5.1.2.7.11.1 Enter the tracking number. If this is a bacteriological sampling event, use the format from Step 5.1.2.7.9.2. (The objective is consistency in naming COCs.)

5.1.2.7.11.2 Complete the Laboratory, Shipped Date/Time, and Shipped By fields.

5.1.2.7.12 In the Chain of Custody Builder window, on the right side in the Unshipped Sample Filter area, select DRINKING WATER for the SAP Table entry.

5.1.2.7.13 Leave the Media and Sample Type fields blank in the Unshipped Sample Filter area.

5.1.2.7.14 Enter the current date for both the Date Range fields and then select the FILTER SAMPLES button to allow the samples for the current sampling event to appear in the Unshipped Samples area.

5.1.2.7.15 Select the ADD button to move the samples to the Samples on This Chain of Custody area.

NOTE 1: *A different COC form prints for a bacteriological sampling event than for other sampling events.*

NOTE 2: *For compliance samples, the first form that prints is for all the noncompliance samples. Upon closing this first form, a second form will open that is for the compliance samples.*

5.1.2.7.16 Select the PRINT button to create a hard-copy version of the COC form.

5.1.2.7.17 IF this was a bacteriological sampling event,
AND samples were collected from within SMC,
THEN replace the page in the printed COC form with the signed-off hard copy of the bacteriological COC form obtained at SMC during the sampling round.

5.1.2.7.18 Close the SAP application.

5.2 Collecting Drinking Water Samples (Other Than Bacteriological and Volatile Organic Compound, including Total Trihalomethane and Haloacetic Acid, Samples)

5.2.1 Collecting Samples at Distribution, Point of Entry, or Manifold

5.2.1.1 Turn the tap on and purge the sample point for 5 minutes to ensure that the sample(s) collected is representative of the water system.

5.2.1.2 If the sample bottle(s) is pre-preserved, don gloves and safety glasses with side shields.

5.2.1.3 Collect the sample(s) with the container(s) provided by the laboratory and/or according to Appendix A, Table A-6.

5.2.1.4 Turn off the tap at the sampling location.

5.2.1.5 Label the sample(s) with the appropriate time, date, and water system.

5.2.1.6 Remove gloves and safety glasses, if applicable.

5.2.1.7 Place the sample(s) in a cooler containing reusable blue ice and ice that, at a minimum, is double-bagged.

5.2.1.8 Record the sample time in the DW field application and on the sample label(s).

5.2.1.9 Complete the COC form provided by the SAP application or designee or specific laboratory COC form.

5.2.1.10 Repeat Steps 5.2.1.1 through 5.2.1.9 for each sampling location.

5.2.1.11 Distribute or retain copies of the COC form as indicated in MCP-8523.

5.2.1.12 Ship the samples to the laboratory as soon as possible to ensure the holding times are met.

5.2.2 Collecting Samples at Drinking Water/Production Wells

5.2.2.1 Obtain a flow meter reading (beginning), if available, and record the reading in the DW field application in the general comment section.

5.2.2.2 Have the operator or mechanic turn the well pump on.

NOTE: *Flow is indicated by the flow meter reading. The minimum purge time begins when water reaches the wellhead (see Appendix E).*

5.2.2.3 Don gloves.

5.2.2.4 Turn on the water.

5.2.2.5 WHEN the purge time has been met,
THEN collect the sample(s) as required by Appendix A, Table A-1.

5.2.2.6 Turn off the water.

5.2.2.7 Have the operator or mechanic turn the well pump off.

5.2.2.8 Record the flow meter reading (ending), if available, in the DW field application in the general comment section.

5.2.2.9 Label the sample(s) with the appropriate time, date, and water system.

5.2.2.10 Remove gloves.

5.2.2.11 Place the sample(s) in a cooler containing reusable blue ice and ice that, at a minimum, is double-bagged.

5.2.2.12 Record the sample time in the DW field application and on the sample label(s).

5.2.2.13 Complete the COC form provided by the SAP application or designee or specific laboratory COC form.

5.2.2.14 Repeat Steps 5.2.2.1 through 5.2.2.13 for each sampling location.

5.2.2.15 Distribute or retain copies of the COC form as indicated in MCP-8523.

5.2.2.16 Ship the samples to the laboratory as soon as possible to ensure the holding times are met.

NOTE 1: *Compliance and noncompliance bacteriological samples are collected at the sample locations listed in Appendix A, Table A-3. The sampler can choose what sample point (e.g., drinking fountain or tap) to collect the samples from.*

NOTE 2: *The sample bottles used to collect bacteriological samples are pre-preserved with sodium thio-sulfate.*

NOTE 3: *To prevent bacteriological contamination of the samples:*

- *Samples should not be collected from outside or swivel faucets, if possible*
- *Sample bottle caps must not be removed until just before collecting the sample*
- *While filling a sample bottle, the cap must be held onto so that neither the lip of the bottle or the inside surface of the cap touches anything.*

NOTE 4: *For collecting bacteriological samples from chlorinated water systems, the chlorine test is performed before collecting the samples.*

NOTE 5: *New gloves must be donned before collecting samples at each sampling location.*

5.3 Collecting Bacteriological Drinking Water Samples

5.3.1 IF collecting noncompliance samples at TRA-670 at the ATR Complex, THEN check in at the ATR Complex Guard Gate, and obtain an ATR badge to gain entry.

5.3.2 IF collecting compliance samples,
AND nobody is in the building,
OR the water is shut off,
THEN go upstream and downstream within five connections to collect the sample.

5.3.3 IF the sample point is a faucet,
THEN use pliers to remove the screen or aerator.

WARNING

Household bleach (sodium hypochlorite) is a strong eye, skin, and mucous membrane irritant. The extent of irritation depends on the concentration of bleach and the duration of exposure.

5.3.4 Before spraying the household bleach solution on the sample point to disinfect it, don safety glasses with side shields and nonpowdered nitrile or latex gloves.

5.3.5 Clean the sample point, using a toothbrush if the sample point is threaded. Spray household bleach on the sample point.

5.3.6 Turn the water on, and allow to flow for a minimum of 60 seconds.

5.3.7 IF collecting samples from a chlorinated water system (see Appendix A, Table A-3, for a list of chlorinated and nonchlorinated water systems), THEN perform the following:

5.3.7.1 Test the water for free chlorine by following instructions for free chlorine testing in the chlorine test kit.

5.3.7.2 IF the result is zero,
THEN turn the water on and purge for an additional 3 minutes and record the chlorine reading in the DW field application.

5.3.7.3 IF the result is still zero,
THEN note in comment section of the DW field application and then collect the sample and GO TO Step 5.3.9.

5.3.8 IF the water system is not chlorinated,
THEN continue to Step 5.3.9.

5.3.9 Record the chlorine reading in the DW field application and on the offsite State of Idaho-certified laboratory-specific form.

5.3.10 Purge the sample point by allowing water to run a minimum of 5 minutes, if possible.

5.3.11 IF the purge time is less than 5 minutes,
THEN record in the DW field application why the sample point was not purged for at least 5 minutes.

5.3.12 Collect the sample(s) by filling the designated sample container to the 120-ml line (second line) on the container, and replace the cap.

5.3.13 After the sample(s) has been collected, wipe the sample point clean with a towel to remove any remaining bleach.

5.3.14 IF cross contamination is suspected,
THEN discard the sample(s) along with its container, and collect another sample with a new container.

5.3.15 IF the sample point is a faucet,
THEN replace the screen or aerator.

NOTE: *Steps 5.3.16 through 5.3.18 can be performed in any order.*

5.3.16 Remove gloves.

5.3.17 Label the sample(s) as follows:

5.3.17.1 Write the following information on the sample label(s):

- Sampler identification
- Date the sample was collected
- Time sample was collected.

5.3.17.2 Cover the label(s) with clear tape to protect the label and prevent smearing of sample information.

5.3.18 Enter sample information into the SAP application.

5.3.19 Place the sample(s) in the designated bacteriological coolers with reusable freezer packs and double-bagged sealed plastic bags of ice to ensure sample cooler temperature is <10°C for transportation to the laboratory for analysis.

5.3.20 Perform sampling handling and packaging in accordance with MCP-8523.

5.3.21 Include the State of Idaho's PWS number (see Appendix A, Table A-3) in the DW field application.

5.3.22 Repeat Steps 5.3.1 through 5.3.21 for each sampling location.

5.3.23 After all sampling is conducted, load the sampling data into the SAP application and print the COC form.

5.3.24 Deliver the samples to the onsite laboratory or State of Idaho-certified laboratory on the same day and/or before the holding time for bacteriological analysis (30 hours) is exceeded.

5.3.25 Transfer the samples following strict COC protocols to the laboratory for analysis.

NOTE 1: *The sample bottles used to collect VOC, including TTHM and HAA5, samples from chlorinated water systems are pre-preserved with ascorbic acid or equivalent.*

NOTE 2: *New gloves must be donned before collecting samples at each sampling location.*

5.4 Collecting Volatile Organic Compound, including Total Trihalomethane and Haloacetic Acid, Drinking Water Samples

5.4.1 IF collecting the sample(s) from a well,
THEN perform the following:

5.4.1.1 Obtain a flow meter reading (beginning), if available, and record the reading in the DW field application in the general comment section.

5.4.1.2 Have the operator or mechanic turn the well pump on.

NOTE: *Flow is indicated by the flow meter reading. The minimum purge time begins when water reaches the wellhead (see Appendix E).*

5.4.1.3 Don nonpowdered nitrile or latex gloves and safety glasses with side shields before collecting the sample(s).

5.4.1.4 Turn on the water and purge the sample point for 5 minutes if possible to ensure that the sample(s) collected is representative of the water system. (See Appendix A, Table A-5.)

5.4.2 IF collecting the sample(s) from another source,
THEN perform the following:

5.4.2.1 Turn the tap on and purge the sample point for 5 minutes if possible to ensure that the sample(s) collected is representative of the water system. (See Appendix A, Table A-5.)

5.4.2.2 Don nonpowdered nitrile or latex gloves and safety glasses with side shields before collecting the sample(s).

5.4.3 WHEN the purge time has been met,
THEN fill the bottle(s) slowly to avoid any visible eddies and aeration of the sample(s).

5.4.4 Fill the bottle(s) until a meniscus of water forms above the top of the bottle.

5.4.5 IF the sample(s) was collected from a chlorinated water system,
THEN add HCL to the sample bottle(s) in the field for preservation. (See EPA Method 524.2, *Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry*, for details.)

5.4.6 Cap the bottle(s) carefully.

5.4.7 Invert the bottle(s) carefully.

5.4.8 Tap the bottle(s) gently to ensure that no air bubbles exist.

5.4.8.1 IF air bubbles appear,
THEN perform the following:

5.4.8.1.1 Do not empty the bottle.

5.4.8.1.2 Open the bottle and slowly add several additional drops of water.

5.4.8.1.3 Take care not to flush away preservatives in the bottle.

5.4.8.1.4 Invert the bottle to check for air bubbles.

5.4.9 Repeat Steps 5.4.7 and 5.4.8 for each bottle to ensure there are no air bubbles in any of the bottles.

5.4.10 IF the sample(s) was collected from a well,
THEN perform the following:

5.4.10.1 Turn off the water.

5.4.10.2 Have the operator or mechanic turn the well pump off.

5.4.10.3 Record the flow meter reading (ending), if available, in the DW field application in the general comment section.

5.4.11 IF the sample(s) was collected from another source,
THEN turn off the tap at the sampling location.

5.4.12 Label the sample(s) with the appropriate time, date, and water system.

5.4.13 Remove gloves.

5.4.14 Place the sample(s) in a sealable bag and then in the cooler containing reusable blue ice and ice that, at a minimum, is double-bagged.

5.4.15 Record the sample time in the DW field application and on the sample label.

5.4.16 Complete the COC form provided by the SAP application or designee or specific laboratory COC form.

5.4.17 Repeat Steps 5.4.1 through 5.4.16 for each sampling location.

5.4.18 If HCL was provided in vials from the laboratory, bring back the vials and after the vials are rinsed; put the used vials in a sharps container at the SPA.

5.4.19 Distribute or retain copies of the COC form as indicated in MCP-8523.

5.4.20 Ship the samples to the laboratory as soon as possible to ensure the holding times are met.

6. POST-PERFORMANCE ACTIVITIES

NOTE: *The laboratory transmits compliance sample data directly to DEQ. Agency reporting is not required for noncompliance sampling.*

6.1 Reporting

6.1.1 WHEN analysis results are received,
THEN review data for any anomalies or maximum contaminant level violations.

6.1.2 IF there are any maximum contaminant level violations or data anomalies
THEN notify the Department of Energy Idaho Operations Office and ES&S Regulatory and Monitoring Services manager and Monitoring Services Program environmental lead, and conduct additional sampling according to regulations.

6.1.3 Conduct technical verification of data as they are manually entered into the SAP application. Then select the DATA VERIFICATION COMPLETE button in the SAP application when completed.

6.1.4 Drinking Water Media Lead: WHEN technical review of the data in the SAP application has been completed,
AND no anomalies or other data issues have been identified,
THEN approve the data for input into the Environmental Data Warehouse.

6.1.5 Drinking Water Media Lead: WHEN data in the SAP application have been approved,
THEN generate a report of the data in the SAP application and submit it to the records coordinator for submission to the Electronic Document Management System.

7. ABNORMAL OPERATIONS

None.

8. RECORDS

COC forms.

Approved SAP application data.

9. REFERENCES

40 CFR 141, "National Primary Drinking Water Regulations," U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

40 CFR 142, "National Primary Drinking Water Regulations Implementation," U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

40 CFR 143, "National Secondary Drinking Water Regulations," U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

DOE O 458.1, "Radiation Protection of the Public and the Environment," U.S. Department of Energy, current issue.

EPA Method 524.2, *Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry*, U.S. Environmental Protection Agency.

Form 580.40, "Request for Shipment."

IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems," Idaho Administrative Procedures Act, current issue.

LI-355, "Working in Environmental Monitoring Services Sample Preparation Areas (SPA)."

GDE-9103, "Conduct of Operations Guidance for Communications," current revision.

MCP-8523, "Managing Hazardous and Non-Hazardous Samples," current revision.

PLN-8510, "Planning and Management of Environmental Support and Services Monitoring Services Activities," current revision.

PLN-8530, "Idaho National Laboratory Drinking Water Monitoring Plan," current revision.

Safe Drinking Water Act, 42 U.S.C. § 300f et seq., 1974.

10. APPENDIXES

Appendix A, Tables

Appendix B, Facility Maps

Appendix C, Guidance for Implementing Bacteriological Detection Notification and Disinfection Process

Appendix D, Quality Assurance/Quality Control Samples

Appendix E, Production Well Data

Appendix F, Procedure Basis

Appendix A

Tables

Table A-1. Idaho National Laboratory (general) drinking water sampling locations and schedule.

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)		State of Idaho	
						GPS No.	PWS No.
ATR Complex	Distribution system	—	Bacteriological	2	Monthly (one sample is collected at TRA-608, valve P1-10-115)	—	6120020
				1	Quarterly[1]		
	Well No. 5[2]	TRA-696	Nitrate	1	Annually[1]	EO 009325	
			Primary drinking water parameters as listed in Table A-6	1	As required		
				1	Tri-annually[1,3]		
			Radiological	1	Semi-annually[1]		
	Valve P1-10-115	TRA-608	Nitrate	1	Annually[1]	—	
			Primary drinking water parameters as listed in Table A-6	1	As required		
				1	Tri-annually[1,3]		
			Radiological	1	Semi-annually[1]		
	TRA-608	TRA-608	HAA5s	1	Annually between July 1 and September 30	—	
			TTHMs	1			
	TRA-658	TRA-658	HAA5s	1	Annually between July 1 and September 30	—	
			TTHMs	1			

Table A-1. (continued).

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)		State of Idaho	
						GPS No.	PWS No.
CFA	Distribution system	—	Bacteriological	2	Monthly[4]	—	6120008
				1	Quarterly[1]		
	CFA-609	CFA-609	HAA5s	1	Tri-annually between July 1 and September 30	—	
			TTHMs	1			
	Manifold	CFA-1603	Nitrate	1	Annually[1]	—	
			Primary drinking water parameters as listed in Table A-6	1	As required		
				1	Tri-annually[1,3]		
			Radiological	1	Semi-annually[4]		
			HAA5s	1	Tri-annually between July 1 and September 30		
			TTHMs	1			
	Well No. 1	CFA-651	Radiological	1	Semi-annually[4]	EO 007586	
	Well No. 2	CFA-642	Radiological	1	Semi-annually[4]	EO 007587	
CITRC	Distribution system	—	Bacteriological	1	Monthly[4]	—	6120019
				1	Quarterly[1]		
	Manifold	PBF-638	Nitrate	1	Annually[1]		
			Radiological	1	Semi-annually[4]		
CTF	Distribution system	—	Bacteriological	1	Monthly[4]	—	6120013
				1	Quarterly[1]		
	Manifold	TAN-1612	Nitrate	1	Annually[1]		
			Primary drinking water parameters as listed in Table A-6	1	As required		
				1	Tri-annually[1,3]		
			Radionuclides	1	Semi-annually[4]		
	TAN-678	TAN-678	HAA5s	1	Tri-annually between July 1 and September 30		
			TTHMs	1			

Table A-1. (continued).

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)		State of Idaho	
						GPS No.	PWS No.
EBR-I	Distribution system	—	Bacteriological	1	Quarterly[4]	—	6120009
				1	May, June, July, August, and September[1]		
	Well	EBR-711	Nitrate	1	Annually[1]		
	EBR-601	EBR-601	Radiological	1	Semi-annually[4]		
Gun Range	Distribution system	—	Bacteriological	1	Monthly[4]	—	6120025
				1	Quarterly[1]		
	Well	B21-607	Nitrate	1	Annually[1]	EO 006590	
	B21-608	B21-608	Radiological	1	Semi-annually[4]	—	
RHLLW	Distribution system	B21-630/631	Bacteriological	1	Monthly[4]	—	6120030
				1	Quarterly[1]		
		B21-630/631	HAA5s	1	Annually between July 1 and September 30		
		B21-630/631	TTHMs	1	Annually between July 1 and September 30		
		B21-630/631	Lead and Copper	1	Tri-annually[1]		
Main Gate	Distribution system	—	Bacteriological	1	Monthly[4]	—	6120015
				1	Quarterly[1]		
	Well	B27-605	Nitrate	1	Annually[1]	EO 006575	
	B27-603	B27-603	Radiological	1	Semi-annually[4]	—	

Table A-1. (continued).

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)		State of Idaho	
						GPS No.	PWS No.
MFC	Distribution system	—	Bacteriological	2	Monthly[4]	—	6060036
				1	Quarterly[1]		
	Manifold	MFC-721	HAA5s	1	Annually between July 1 and September 30		
			TTHMs	1			
	Manifold	MFC-754	Nitrate	1	Annually		
			Primary drinking water parameters as listed in Table A-6	1	As required		
				1	Tri-annually[1,3]		
			Radiological	1	Semi-annually		
			HAA5s	1	Annually between July 1 and September 30		
			TTHMs	1			
	Manifold	MFC-1740	Nitrate	1	Annually	—	
			Primary drinking water parameters as listed in Table A-6	1	As required		
				1	Tri-annually[3]		
			Radiological	1	Semi-annually		
			HAA5s	1	Annually between July 1 and September 30		
			TTHMs	1			
TSF	Distribution system	—	Bacteriological	1	Monthly[4]	—	6120021
				1	Quarterly[1]		
	Well No. 2	TAN-613	VOCs	1	Annually[4]	EO 007590	
			Nitrate	1	Annually[3]	—	
	TSF-610	TSF-610	Radiological	1	Semi-annually	—	

Table A-1. (continued).

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)	State of Idaho GPS No.	State of Idaho PWS No.

Key: ATR = Advanced Test Reactor
CFA = Central Facilities Area
CITRC = Critical Infrastructure Test Range Complex
CTF = Containment Test Facility
EBR-I = Experimental Breeder Reactor-I
GPS = Global Positioning System
HAA5 = haloacetic acid
MFC = Materials and Fuels Complex
PWS = public water system
TSF = Technical Support Facility
TTHMs = total trihalomethanes
VOC = volatile organic compound.

1. Compliance samples.
2. ATR Complex wells No. 1, No. 3, and No. 4 are used as backup drinking water wells.
3. Waivers from the Idaho Department of Environmental Quality can be applied for and reduce monitoring frequency from 3 years to 6 or 9 years.
4. Surveillance samples.

Table A-2. Radiological drinking water semi-annual sampling locations and schedule.

Facility/ Area	Sample Point—Well or Manifold	Building No.	Contaminant	Purge Time (min.)	State of Idaho GPS No.	State of Idaho PWS No.	Historical Sample Location Code[1]
ATR Complex	Manifold	TRA-608	Gross alpha/beta	5	—	6120020	128
			Tritium				
CFA	Manifold	CFA-1603	Gross alpha/beta	5	—	6120008	126
			Tritium				
			Iodine-129				
	Well No. 1	CFA-651	Tritium	8	EO 007586		102
	Well No. 2	CFA-642	Tritium	11	EO 007587		103
CITRC	Manifold	PBF-638	Gross alpha/beta	5	—	6120019	129
			Tritium				
CTF	Manifold	TAN-1612	Gross alpha/beta	5	—	6120013	127

Facility/ Area	Sample Point— Well or Manifold	Building No.	Contaminant	Purge Time (min.)	State of Idaho		Historical Sample Location Code[1]
					GPS No.	PWS No.	
			Tritium				
EBR-I	EBR-601	EBR-601	Gross alpha/beta	5	—	6120009	131
			Tritium				
Gun Range	B21-608	B21-608	Gross alpha/beta	5	—	6120025	133
			Tritium				
Main Gate	B27-603	B27-603	Gross alpha/beta	5	—	6120015	130
			Tritium				
MFC	Manifold	MFC-754	Gross alpha/beta	5	—	6060036	151
			Tritium				
	Manifold	MFC-1740	Gross alpha/beta	5	—	6060036	152
			Tritium				
TSF	TSF-610	TSF-610	Gross alpha/beta	5	—	6120021	111
			Tritium				
Quality assurance/ control	Various	Various	X	?	—	Various	180-199

1. Codes were used to identify samples collected at INL prior to BEA being awarded the contract to operate and maintain INL.

Table A-3. Bacteriological drinking water sampling locations and schedule.

Facility Area	Sample Type	Sampling Month (Code to be used on Bacteriological Chain of Custody Form)												State of Idaho PWS No.
		Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
ATR Complex	Compliance	608	—	—	616	—	—	1608	—	—	625	—	—	6120020
	Noncompliance	625	658	620	608	616	620	680	670	620	616	614	620	—
		—	652	1608	—	625	679	—	680	1608	—	628	649	
	Noncompliance[1,b]	Valve	Valve	Valve	Valve	Valve	Valve	Valve	Valve	Valve	Valve	Valve	Valve	
CFA	Compliance	615	—	—	696	—	—	1608	—	—	621	—	—	6120008
	Noncompliance	1606	1612	1611	1612	698	612	615	1606	614	624	621	696	—
		—	621	608	—	696	1611	—	1612	1608	—	1612	609	
CITRC	Compliance	638	—	—	638	—	638	638	—	—	638	—	—	6120019
	Noncompliance	—	638	638	—	638	—	—	638	638	—	638	638	—
CTF	Compliance	678	—	—	678	—	—	678	—	—	678	—	—	6120013
	Noncompliance	—	1615	676	—	1615	676	—	1615	676	—	1615	676	—
EBR-I[1]	Compliance	NA[3]	NA	NA	NA	601	601	601	601	601	NA	NA	NA	6120009
	Noncompliance	601—once per quarter			—	NA	NA	NA	NA	NA	601	NA	NA	—
Gun Range[1]	Compliance	B21-608	—	—	B21-608	—	—	B21-608	—	—	B21-608	—	—	6120025
	Noncompliance	—	B21-608	B21-608	—	B21-608	B21-608	—	B21-608	B21-608	—	B21-608	B21-608	—
Main Gate[1]	Compliance	B27-603	—	—	B27-603	—	—	B27-603	—	—	B27-603	—	—	6120015
	Noncompliance	—	B27-603	B27-603	—	B27-603	B27-603	—	B27-603	B27-603	—	B27-603	B27-603	—
MFC	Compliance	752	—	—	1727	—	—	752	—	—	721	—	—	6060036
	Noncompliance	791	710	713	701	718	716	725	714	753	768	782	1727	—
		—	785	728	—	791	721	—	701	774	—	710	720	
RHLLW	Compliance	B21-631	—	—	B21-631	—	—	B21-631	—	—	B21-631	—	—	6120030
	Noncompliance	—	B21-630	B21-631	—	B21-630	B21-631	—	B21-630	B21-631	—	B21-630	B21-631	—
TSF	Compliance	687	—	—	687	—	—	687	—	—	687	—	—	6120021
	Noncompliance	—	687	687	—	687	687	—	687	687	—	687	687	—

[1] Nonchlorinated water system.
[2] Valve P1-10-115 is located at TRA-608.
[3] NA—not occupied or heated during the off-season.

Table A-4. State-required bacteriological compliance drinking water sampling schedule and routine, repeat, and well sampling locations.

Water System	Sampling Month (Quarterly/Other)	Routine Sampling Location	Repeat Sampling Location[1]	Well Sampling Location
ATR Complex	January	TRA-608	TRA-608	TRA-696
			TRA-625	
			TRA-616	
	April	TRA-616	TRA-616	
			TRA-608	
			TRA-625	
	July	TRA-1608	TRA-1608	
			TRA-680	
			TRA-616	
	October	TRA-625	TRA-625	
			TRA-616	
			TRA-1608	
CFA	January	CFA-615	CFA-615	CFA-642 and CFA-651
			CFA-1606	
			CFA-612	
	April	CFA-696	CFA-696	
			CFA-1608	
			CFA-1612	
	July	CFA-1608	CFA-1608	
			CFA-615	
			CFA-1611	
	October	CFA-621	CFA-621	
			CFA-622	
			CFA-624	
CITRC	January, April, July, and October	PBF-638	PBF-638	PBF-602 and PBF-614

Table A-4. (continued).

Water System	Sampling Month (Quarterly/Other)	Routine Sampling Location	Repeat Sampling Location[1]	Well Sampling Location
CTF	January, April, July, and October	TAN-678	TAN-678	TAN-632 and TAN-639
			TAN-676	
			TAN-1615	
EBR-I	May, June, July, August, and September	EBR-601 drinking fountain	EBR-601 drinking fountain, downstairs restroom, and upstairs restroom[2]	EBR-711
Gun Range	January, April, July, and October	B21-608 tap in janitor's room	B21-608 tap in janitor's room, women's restroom, and men's restroom	B21-607
Main Gate	January, April, July, and October	B27-603 tap in break room	B27-603 tap in break room, drinking fountain, and conference room	B27-605
MFC	January	MFC-752	MFC-752	MFC-754/756
			MFC-1727	
			MFC-791	
	April	MFC-1727	MFC-1727	
			MFC-714	
			MFC-752	
	July	MFC-752	MFC-752	
			MFC-1727	
			MFC-791	
	October	MFC-721	MFC-721	
RHLLW	January, April, July, and October	B21-631	B21-631	TRA-696
			B21-630	
TSF	January	TAN-687 kitchen	TAN-687 kitchen, drinking fountain, and men's restroom	TAN-613
	April, July, and October	B27-603 tap in break room		

1. If water is unavailable at the repeat sample location, the sample will be collected upstream and downstream within five connections of the routine sample location.
2. Seasonal water system.

Table A-5. Volatile organic compound drinking water sampling locations and schedule.

Facility/Area	Sample Point—Production Well or Distribution/Manifold	Building No.	Sampling Frequency			Purge Time (min.)	State of Idaho	
			Annually	Semi-Annually	Tri-Annually		GPS No.	PWS No.
ATR Complex	Well No. 5[1]	TRA-696	—	—	X	5	EO 009325	6120020
CFA	Manifold[1]	CFA-1603	—	—	X	5	—	6120008
CITRC	Manifold[1]	PBF-638	—	—	X	5	—	6120019
CTF	Manifold[1]	TAN-1612	—	—	X	5	—	6120013
EBR-I	Well[2]	EBR-711	—	—	X	5	—	6120009
Gun Range	Well[2]	B21-607	—	—	X	5	EO 006590	6120025
Main Gate	Well[2]	B27-605	—	—	X	5	EO 006575	6120015
MFC	Manifold[1]	MFC-754	—	—	X	5	—	6060036
	Manifold	MFC-1740	—	—	X	5	—	6060036
TSF[1]	Well No. 2[2]	TAN-613	—	X	—	4	EO 007590	6120021
Quality assurance/ control	Various	Various	X	—	—	—	—	—

1. Chlorinated water system.
2. Nonchlorinated water system.

Table A-6. Examples of recommended containers, preservation, and hold times (not all inclusive).

Test	Contaminant	Minimum Sample Volume/Container	Preservation[1]	Maximum Hold Time
Bacterial	Coliform, fecal and total	100 mL, 150-mL Colilert	Cool, 4°C, 0.008% $Na_2S_2O_3$	30 hours
	General bacteria			
Inorganic	Chloride	125 mL, P, HDPE	None required	28 days
	Chromium, total	500 mL, P, HDPE	Cool, 4°C	180 days
	Color	125 mL, P, HDPE	Cool, 4°C	48 hours
	Cyanide	1,000 mL, G	Cool, 4°C NaOH to pH >12	14 days
	Fluoride	250 mL, P, HDPE	None required	28 days
	Hardness	250 mL, P, HDPE	HNO_3 to pH <2	180 days
	Nitrate as N	125 mL, P	Cool, 4°C	48 hours
	Nitrite as N	125 mL, P	Cool, 4°C	48 hours
	Total nitrate + nitrite	125 mL, P	H_2SO_4 to pH <2	28 days
	Total dissolved solids	250 mL, P, HDPE	Cool, 4°C	7 days
Metals	Antimony	500 mL, P, G	HNO_3 to pH <2	180 days
	Arsenic	500 mL, P	HNO_3 to pH <2	180 days
	Barium	500 mL, P, G	HNO_3 to pH <2	180 days
	Beryllium	500 mL, P, G	HNO_3 to pH <2	180 days
	Cadmium	500 mL, P, G	HNO_3 to pH <2	180 days
	Copper	500 mL, P	HNO_3 to pH <2	180 days
	Iron	500 mL, P	HNO_3 to pH <2	180 days
	Lead	500 mL, P	HNO_3 to pH <2	180 days
	Manganese	500 mL, P	HNO_3 to pH <2	180 days
	Mercury	250 mL, P, G	HNO_3 to pH <2	28 days
	Selenium	500 mL, P, G	HNO_3 to pH <2	180 days

Table A-6. (continued).

Test	Contaminant	Minimum Sample Volume/Container	Preservation[1]	Maximum Hold Time
Metals (cont.)	Silver	500 mL, P	HNO_3 to pH <2	180 days
	Sodium	500 mL, P	HNO_3 to pH <2	180 days
	Thallium	500 mL, P, G	HNO_3 to pH <2	180 days
	Zinc	500 mL	HNO_3 to pH <2	180 days
Other Analytes	Sulfate	125 mL, P, HDPE	Cool, 4°C	28 days
	Corrosivity	100 mL, P, G, HDPE	None	14 days
	Odor	125 mL, G, P	None	48 hours
	Foaming agents (MBAS)	500 mL, P, G, HDPE	Cool, 4°C	7 days
	Temperature	60 mL P, G, HDPE	None	Analyze in the field
	Turbidity	125 mL, P, HDPE	Cool, 4°C	48 hours
	Perchlorate	250 mL HDPE	None required	28 days
Organic	Chlorinated acid (2, 4-DB)	1-L G, Teflon-lined cap	Cool, 4°C HCL to pH <2 for chlorinated water system 0.5-mL $Na_2S_2O_3$ for nonchlorinated system	Collection to extraction: 14 days Extraction to analysis: 14 days
	HAA5s	3, 50-mL AG vial, Teflon-lined cap	Cool, 4°C, 5-mg ammonium chloride	Collection to extraction: 14 days Extraction to analysis: 14 days
	Polychlorinated biphenyls	1-L AG, Teflon-lined cap	Cool, 4°C	Collection to extraction: 14 days Extraction to analysis: 30 days
	Pesticides[2]	2-L AG, Teflon-lined cap	Cool, 4°C	Collection to extraction: 14 days Extraction to analysis: 30 days
	TTHMs	3, 40-mL G, Teflon-lined cap	Cool, 4°C 0.008% ascorbic acid for chlorinated water systems and HCL to pH <2; HCL to pH <2 for nonchlorinated water system	14 days

Table A-6. (continued).

Test	Contaminant	Minimum Sample Volume/Container	Preservation[1]	Maximum Hold Time
Organic (cont.)	VOCs (chlorinated system)	3, 40-mL G, Teflon-lined cap	Cool, 4°C 0.008% ascorbic acid and HCL	14 days
	VOCs (nonchlorinated system)	3, 40-mL G, Teflon-lined cap	Cool, 4°C, HCL to pH <2	14 days
Radiological	Alpha, beta	1,000 mL, P, G	HNO_3 to pH <2	180 days
	Iodine-129	4 L and/or 1 gal, AG, P	None	180 days (AG)
				28 days (P)
	Radon-222	3 × 40 mL AG	Cool, 4°C	14 days
	Strontium-90	1,000 mL, P, G	HNO_3 to pH <2	180 days
	Tritium	250 mL, P, G	None	180 days

Key: AG = amber glass
G = glass
HCL = hydrochloric acid
HDPE = high-density polyethylene
P = polyethylene.

1. Follow instructions from the laboratory or the specific method for proper preservation.
2. Endrin, lindane, methoxychlor, toxaphene.

Appendix B

Facility Maps

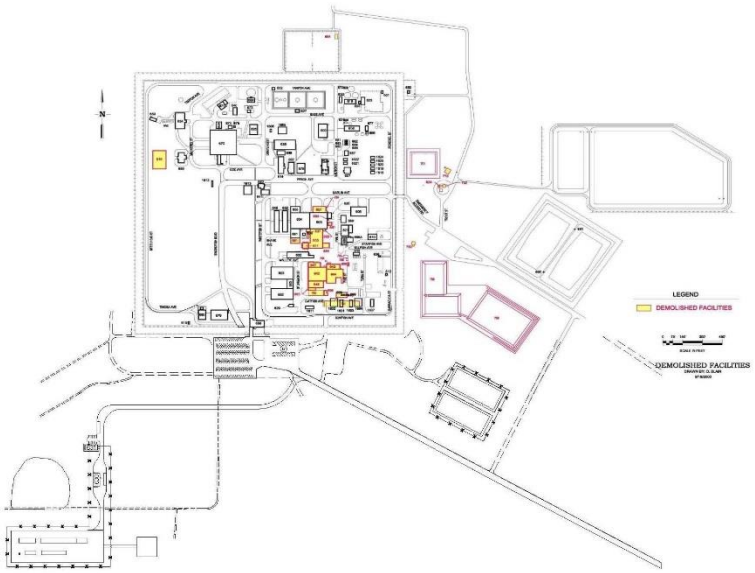


Figure B-1. Advanced Test Reactor Complex.

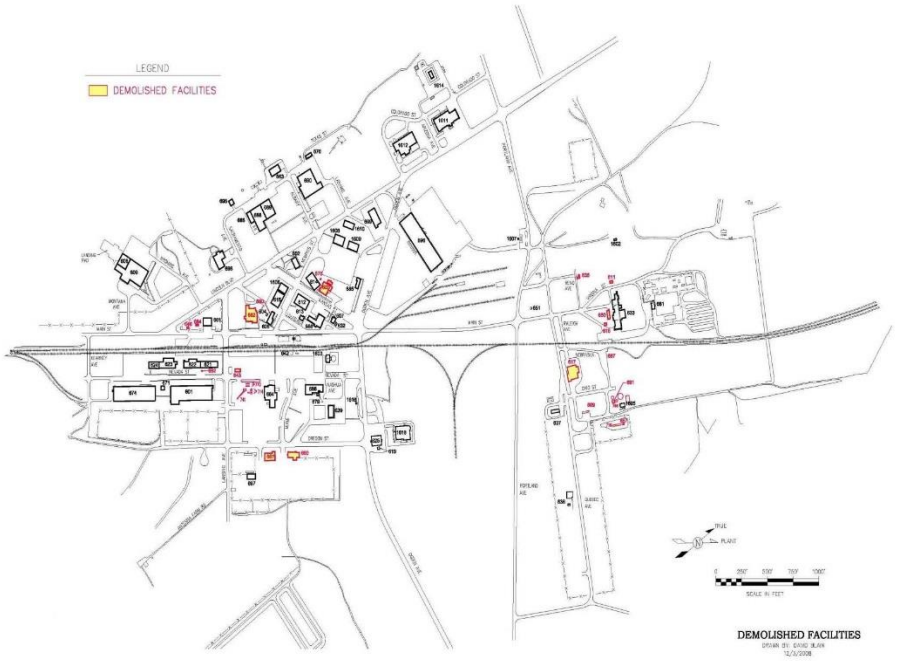


Figure B-2. Central Facilities Area.

Appendix B

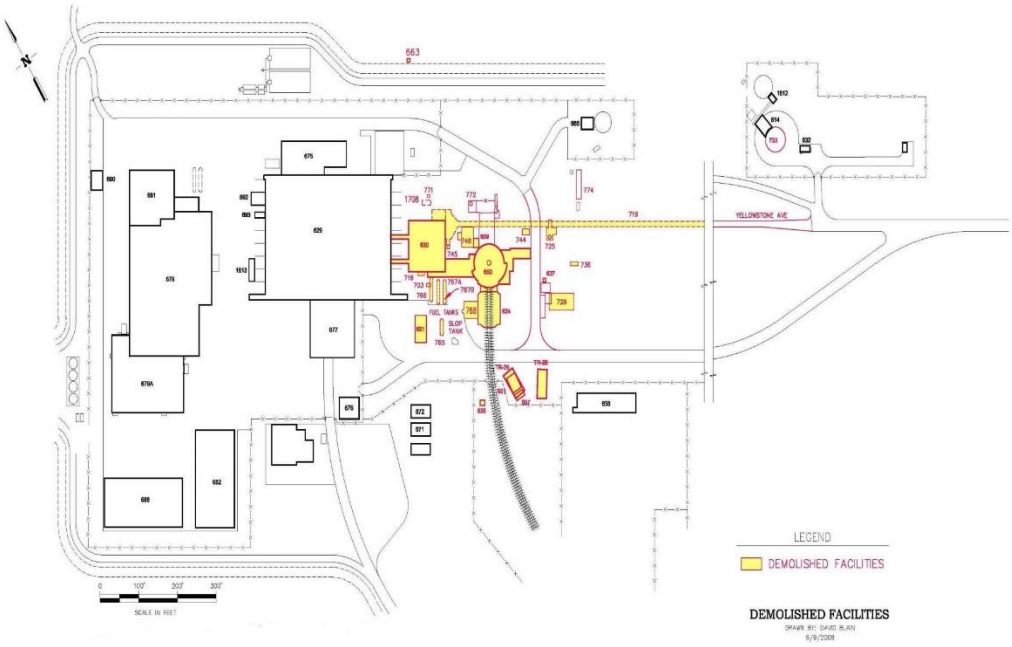


Figure B-3. Containment Test Facility/Test Area North.

Appendix B

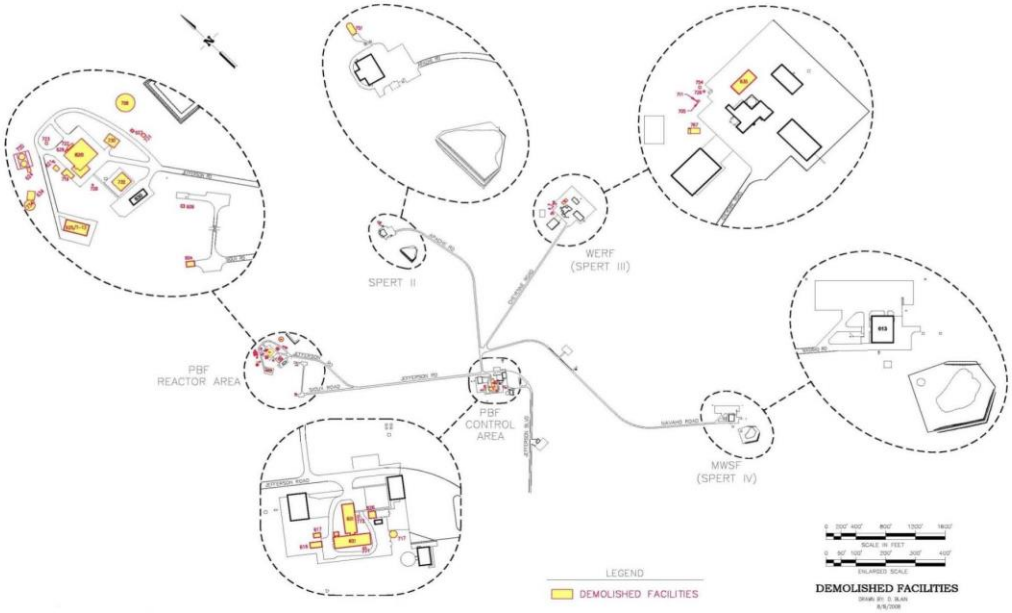


Figure B-4. Critical Infrastructure Test Range Complex.

Appendix B

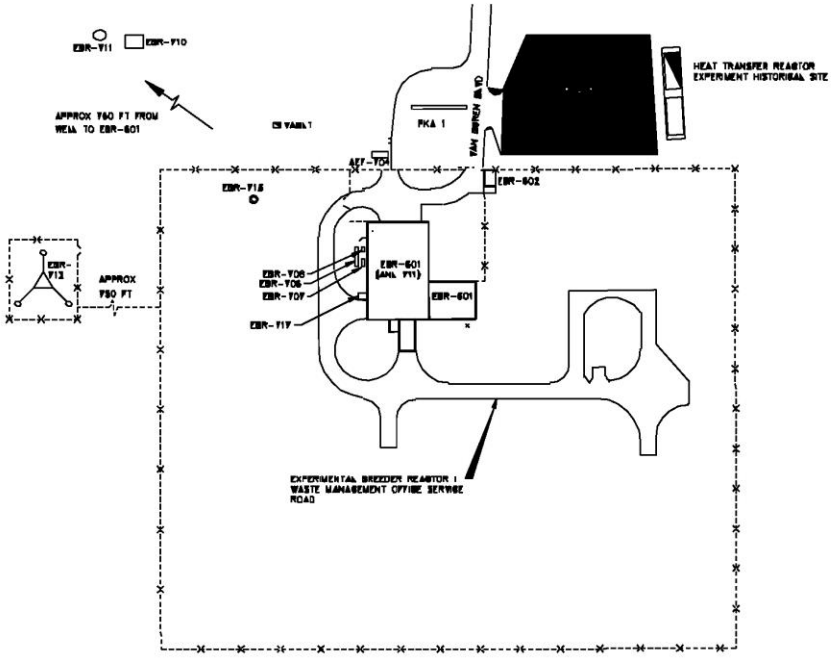


Figure B-5. Experimental Breeder Reactor-I.

Appendix B

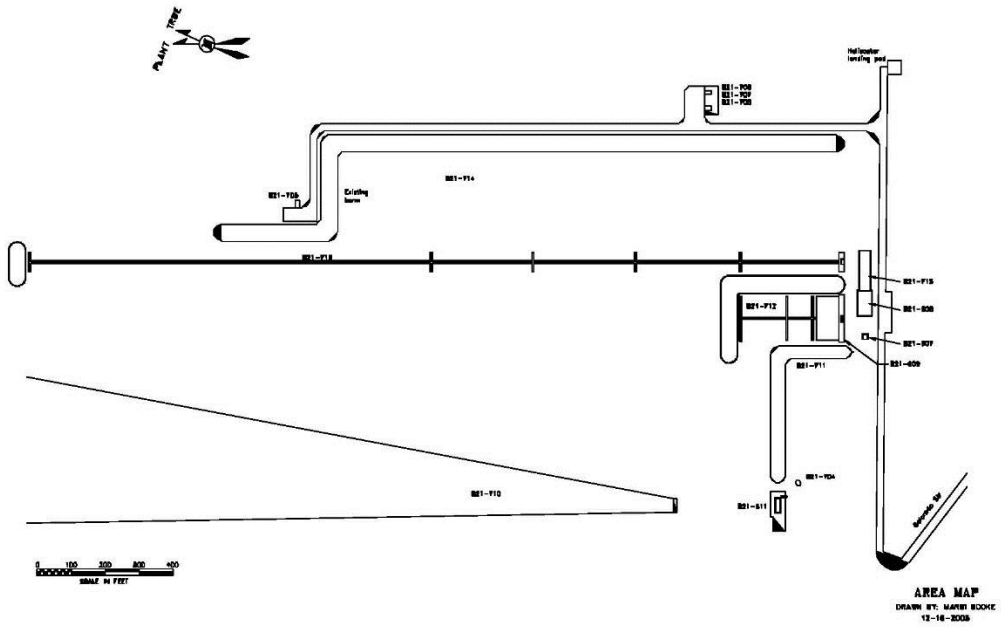


Figure B-6. Gun Range.

Appendix B

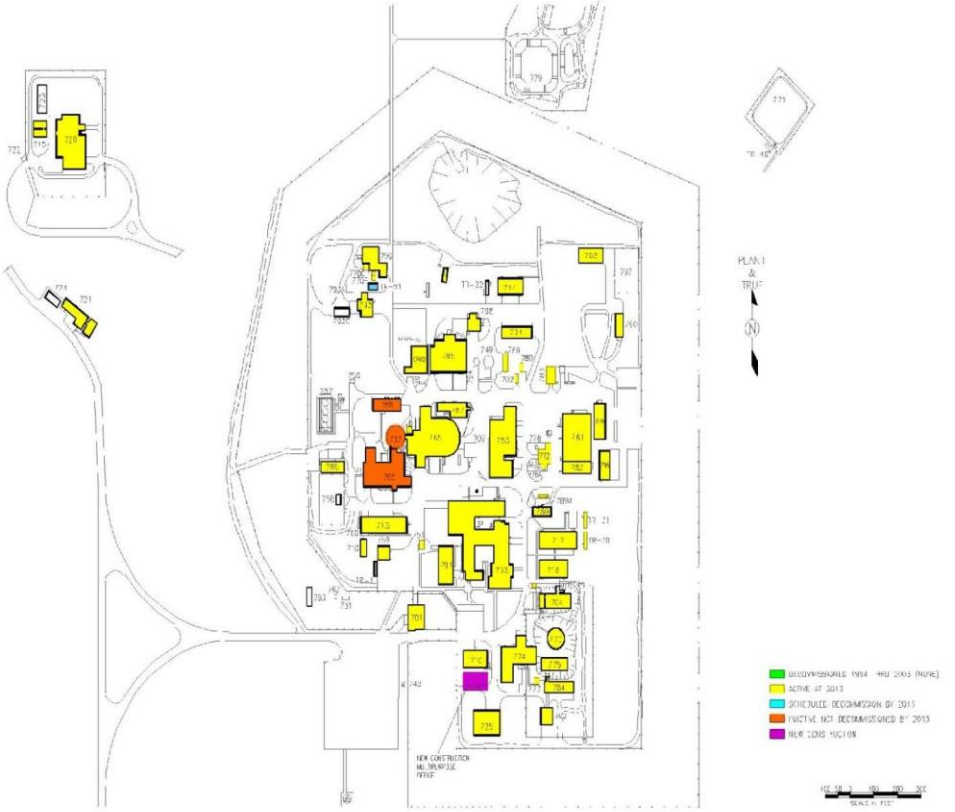


Figure B-7. Materials and Fuels Complex.

Figure B-8. Technical Support Facility/Test Area North.

Appendix B

Appendix C

Guidance for Implementing Bacteriological Detection Notification and Disinfection Process

C-1. INTRODUCTION

This appendix provides guidance for Environmental Support and Services (ES&S) Monitoring Services, in coordination with the area landlord, to implement the bacteriological detection notification and disinfection process. This process is implemented if coliform bacterium is detected at an Idaho National Laboratory (INL) facility as a result of routine compliance sampling and will provide consistency among all INL facilities as it applies to notification requirements and disinfection of water systems.

Proper implementation of the bacteriological detection notification and disinfection process is a fundamental aspect of ES&S Monitoring Services and the safety program at INL. Additional questions or clarification can be directed to Drinking Water Program personnel at 526-2723.

C-2. NOTIFICATION AND DISINFECTION PROCESS

1. ES&S Monitoring Services: If routine compliance samples collected at an INL facility are positive for *coliform bacterium*, make notifications and collect three repeat samples within the specified time limits as follows:

   A. As soon as possible, but within 24 hours after notification by the laboratory of the results, notify the area landlord of the bacterial (coliform) detection.

   B. Within 24 hours after notification by the laboratory of the results, in conjunction with the area landlord, notify the Department of Energy Idaho Operations Office drinking water counterpart of the coliform detection.

   C. Within 24 hours after notification by the laboratory of the results, collect three repeat samples (one from the same tap, one from upstream, and one from downstream). Ensure the repeat upstream and downstream samples are collected within five connections of the routine compliance sample location.

2. Inform the area landlord of the possibility of supplying bottled water pending repeat sampling confirmation results.

3. In conjunction with the area landlord and following the regulations in 40 CFR 141, "National Primary Drinking Water Regulations," Subpart Y, Revised Total Coliform Rule; and IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems," perform the following:

   NOTE: *If E. Coli is identified as the source of contamination, a level two assessment has to be completed by the State of Idaho Department of Environmental Quality.*

   A. Initiate and conduct a sanitary survey (level one assessment) of the water system to try to identify the source of contamination.

   B. Notify the State of Idaho Department of Environmental Quality, via the Department of Energy Idaho Operations Office drinking water counterpart, of the bacterial (coliform) detection and corrective actions being conducted.

NOTE: *If repeat sample results are absent for total coliform and E. Coli bacteria, there is no need to disinfect the water system, but three samples are required to be collected the following month.*

4. IF repeat sample results are absent for total coliform and E. Coli bacteria, THEN GO TO Step C-2.6.

5. IF repeat sample results are positive for bacteria (i.e., E. Coli or fecal coliform), THEN perform the following:

   A. Instruct the area landlord to perform the following:

      i. Post signs on the doors going into each building of the facility and at all drinking fountains and sinks within the building as follows:

         (a) If the positive bacteria samples indicate total coliform bacteria, post the appropriate template, or obtain the template from http://www.deq.idaho.gov.

         (b) If the positive bacteria samples indicate E. Coli and/or fecal coliform bacteria, post a sign as indicated in 40 CFR 141, Subpart Q, Public Notification of Drinking Water Violations.

      ii. Arrange for bottled water from two local dealers.

Appendix C

NOTE: *One method recommended to disinfect the water system is to chlorinate the storage tank to not less than 10 ppm (10 mg/L) free chlorine using calcium or sodium hypochlorite. The chlorinated water should be introduced into the water system by opening hydrants, faucets, and any water outlet in every building, and allowing the chlorinated water to flow throughout the system until chlorine is detected, then letting the water stand in the system for 24 hours. The chlorinated water in storage tanks should not be released to the sanitary sewer, but may be released to the ground surface.*

iii. Disinfect the water system according to AWWA C652, "Disinfection of Water Storage Facilities." Contact Drinking Water Program personnel at 526-2723 for guidance.

NOTE: *Flushing the water system includes every tap inside and outside, in every building. Flushing the water system should reduce the chlorine level.*

iv. After the required hold time, flush the water system.

NOTE: *ES&S Monitoring Services will assist facility personnel in supplying equipment to test chlorine content.*

iv. Test the water to ensure the free chlorine level is <2.0 ppm (mg/L).

B. After the water system has been flushed and the free chlorine level is <2.0 ppm (mg/L), collect at least two samples per day for 2 consecutive days.

C. After 2 consecutive days with no samples positive for coliform bacterium, instruct the area landlord to place the water system back into service by removing posted templates or signs.

D. Continue with Step C-2.6.

6. The following month, collect three samples for compliance purposes.

Appendix C

C-3. REFERENCES

40 CFR 141,"National Primary Drinking Water Regulations," Subpart Q, Public Notification of Drinking Water Violations, U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

40 CFR 141, "National Primary Drinking Water Regulations," Subpart Y, Revised Total Coliform Rule, U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

AWWA C652, "Disinfection of Water Storage Facilities," American Water Works Associations, current edition.

Appendix C

Appendix D

Quality Assurance/Quality Control Samples

D-1. DESCRIPTION OF QUALITY CONTROL SAMPLES

1. ***Split***—Collect the sample following the same protocol as for a regular sample, except use a double-size container. Preserve the sample, mix, and then pour into two separate containers of regular size. Seal the containers.

2. ***Field Blank***—Fill the container with organic-free or deionized water following the same protocol as for a regular sample. Preserve at the same time that you preserve the other samples of the same analysis type.

3. ***Trip Blank***—Volatile organics: Use the same size vial (from the same batch of samples if possible) and fill the vial with organic-free water and preservative, if required (preferable to the ppb range). Seal the sample. This trip blank must accompany the samples at all times until analysis is completed.

4. ***Duplicate***—Collect the sample following the same protocol as for a regular sample. Preserve, seal, and handle the duplicate sample the same as a regular sample.

D-2. QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality assurance/quality control samples may be submitted to participating laboratories at the discretion of the media lead.

The laboratory will be required to run and submit along with the data packages, all laboratory quality control samples that are required by the specific method (e.g., matrix spikes, matrix spike duplicates, and blanks).

Appendix E

Production Well Data

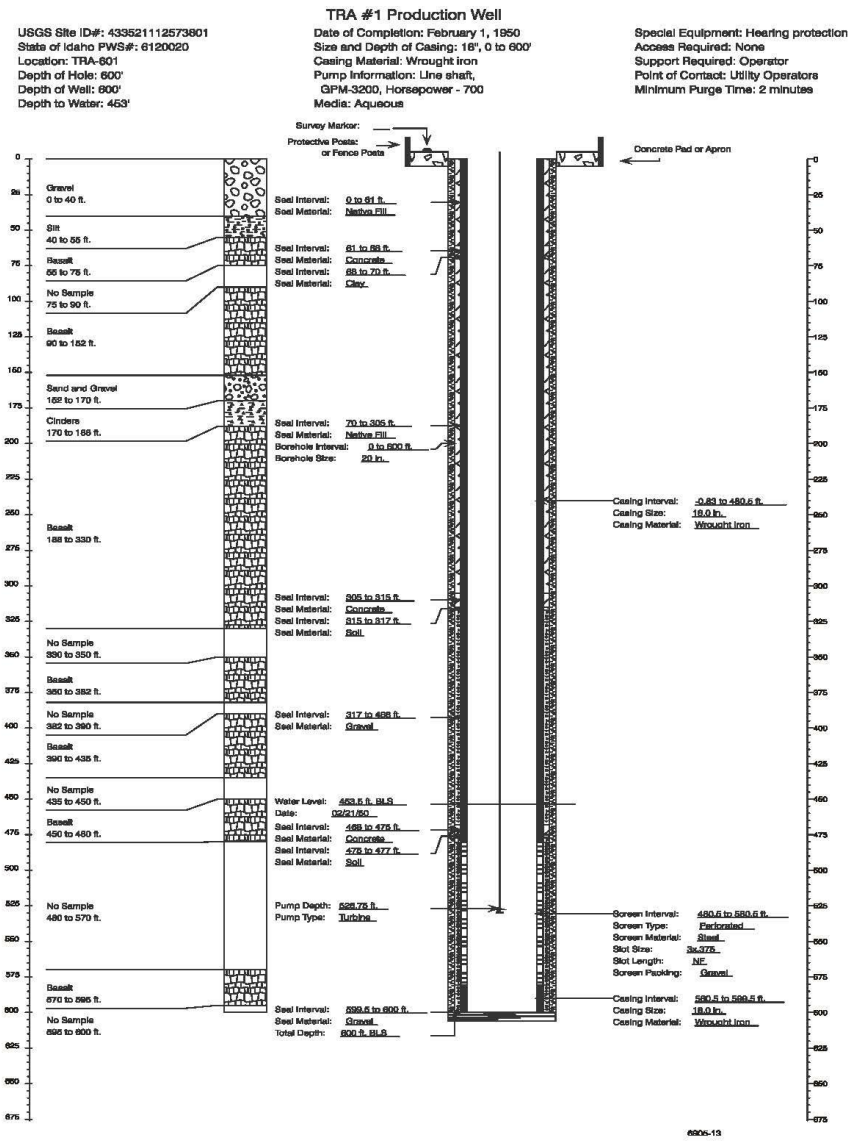


Figure E-1. Advanced Test Reactor Complex production well No. 1.

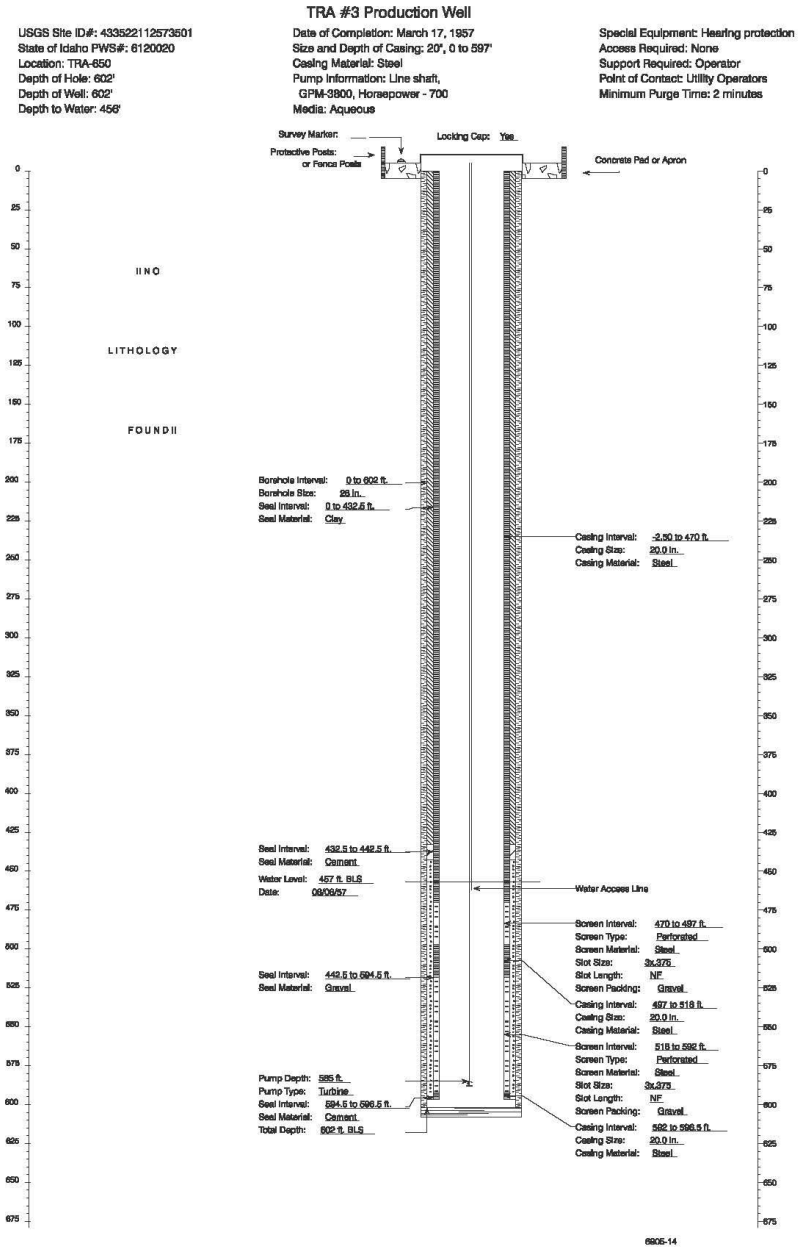


Figure E-2. Advanced Test Reactor Complex production well No. 3.

Appendix E

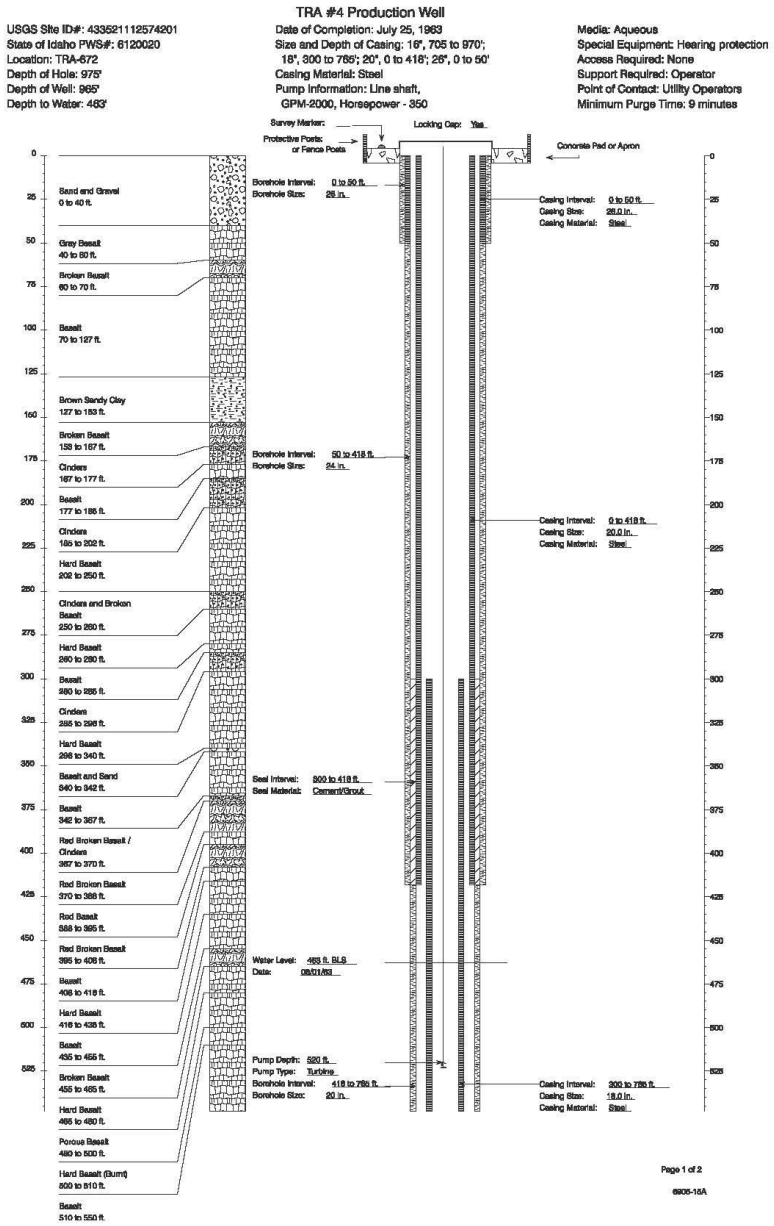


Figure E-3. Advanced Test Reactor Complex production well No. 4.

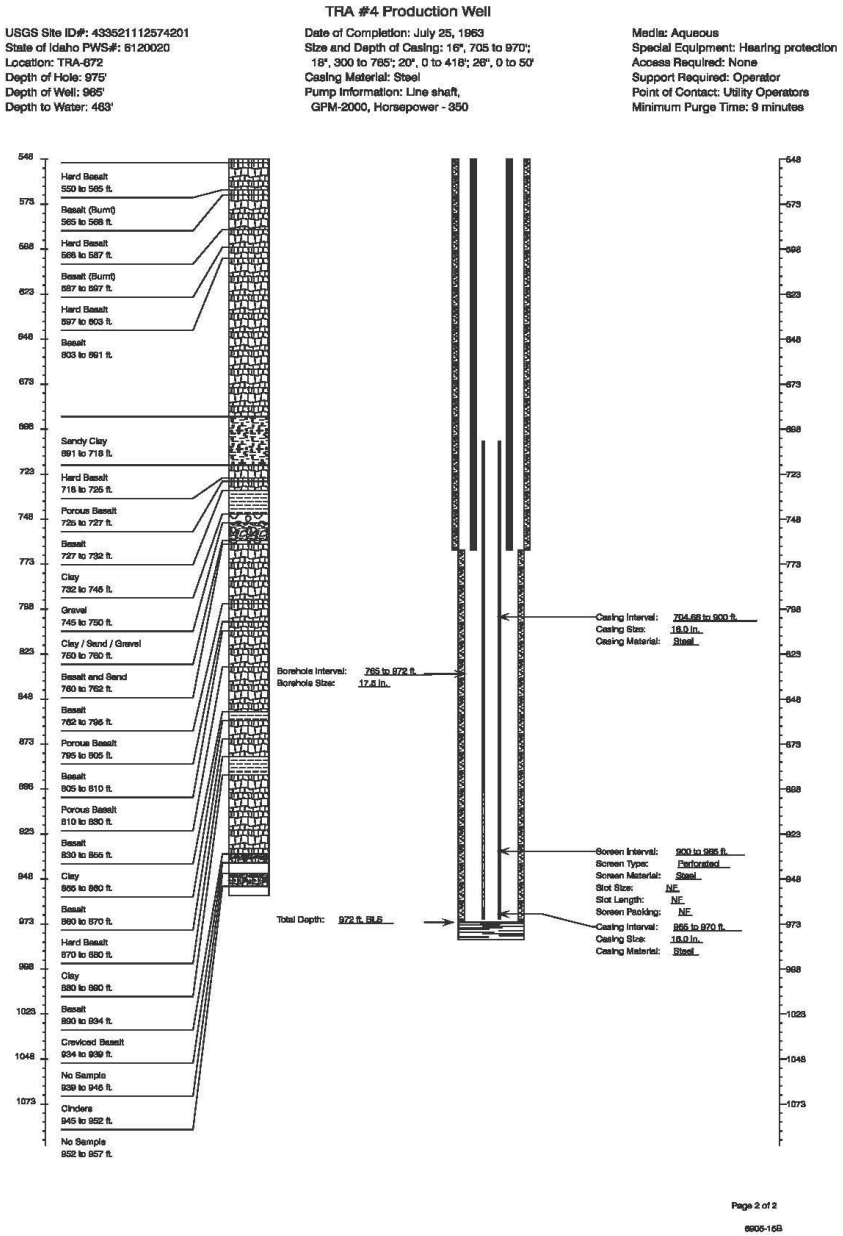


Figure E-4. Advanced Test Reactor Complex production well No. 4 (continued).

Appendix E

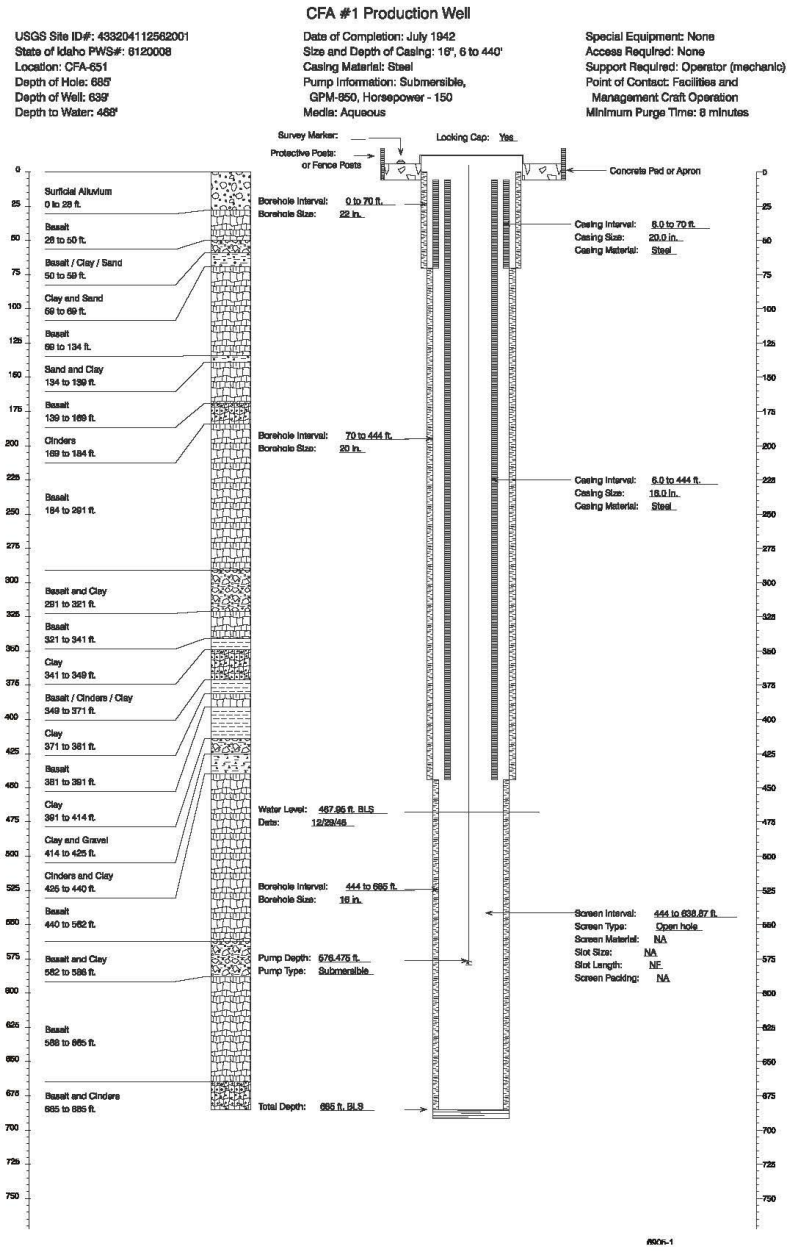


Figure E-5. Central Facilities Area production well No. 1.

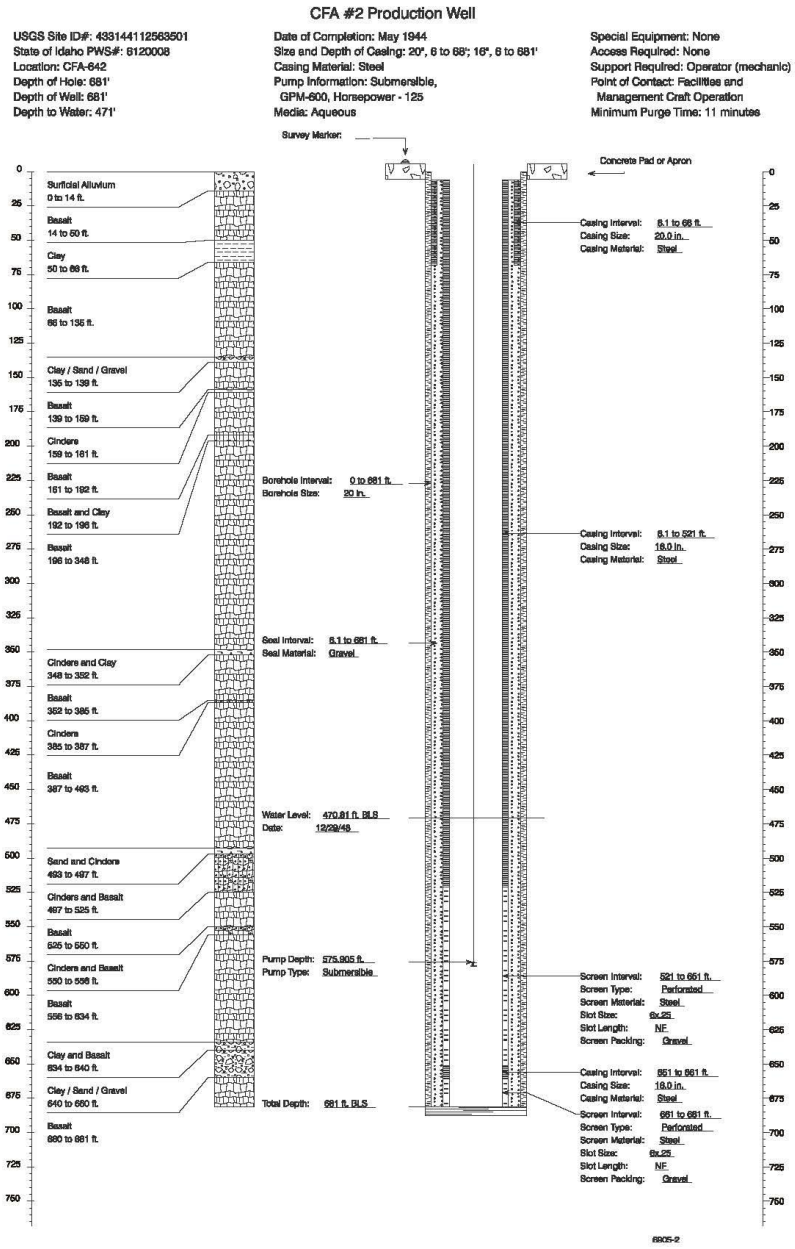


Figure E-6. Central Facilities Area production well No. 2.

Appendix E

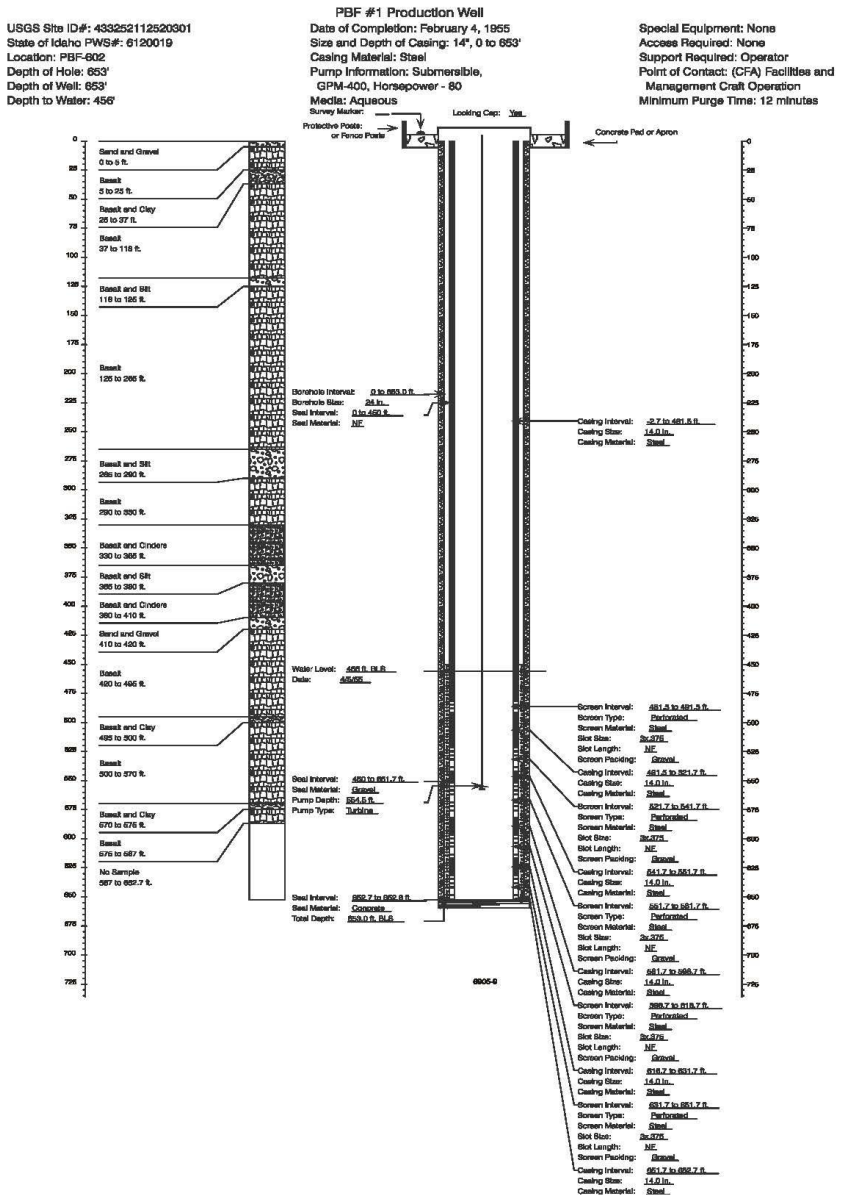


Figure E-7. Critical Infrastructure Test Range Complex production well No. 1.

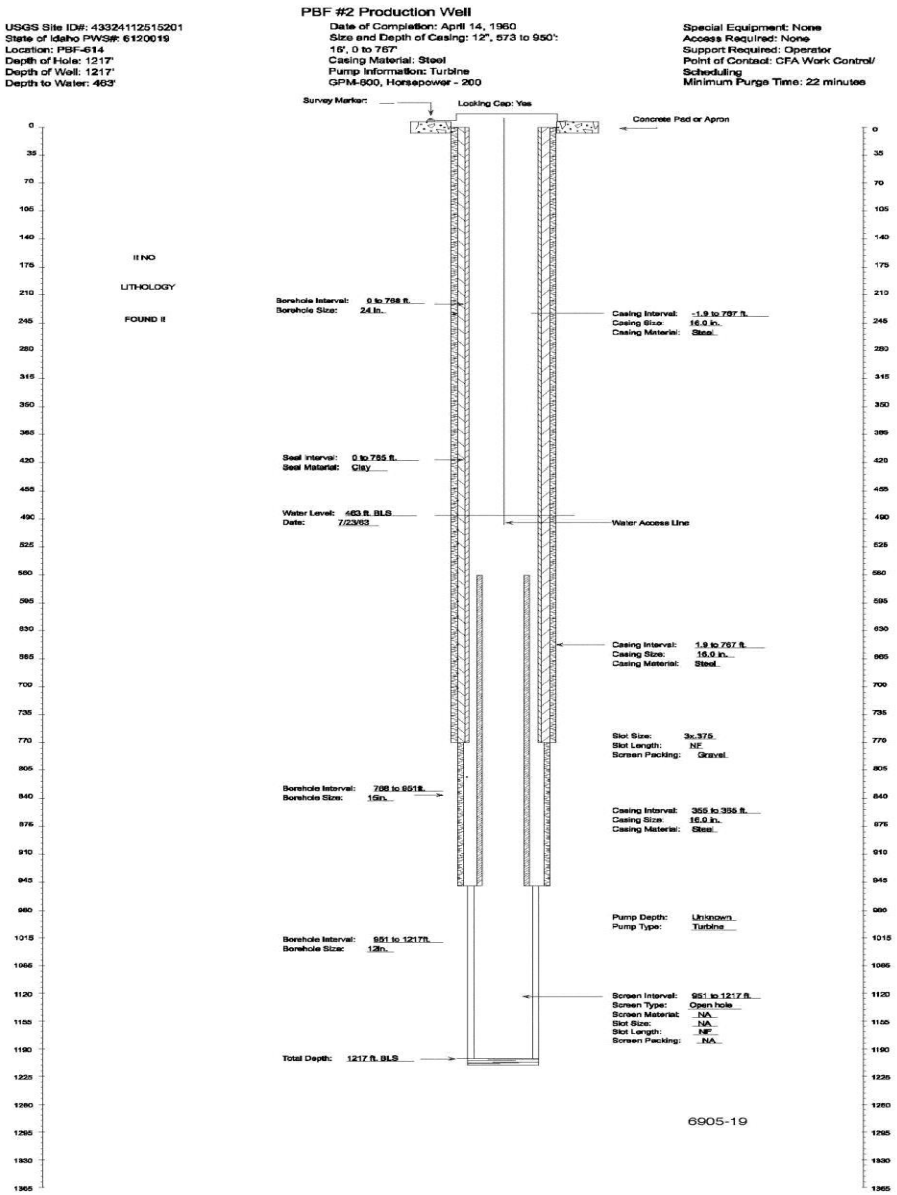
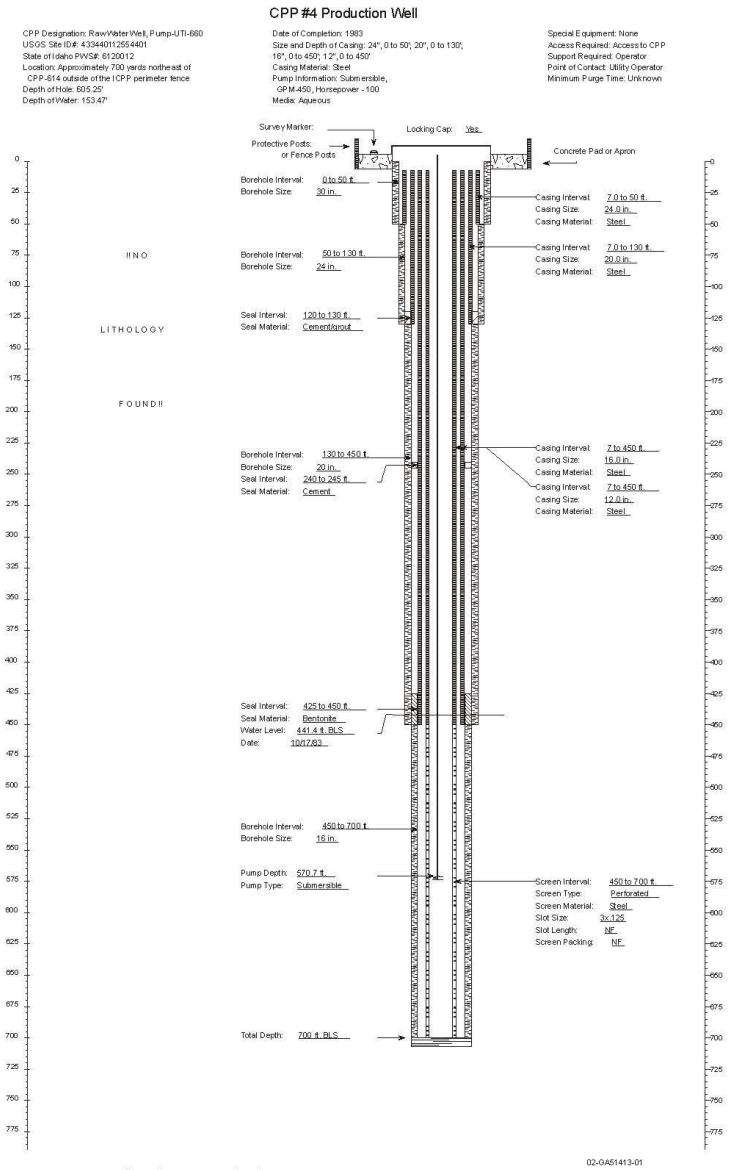
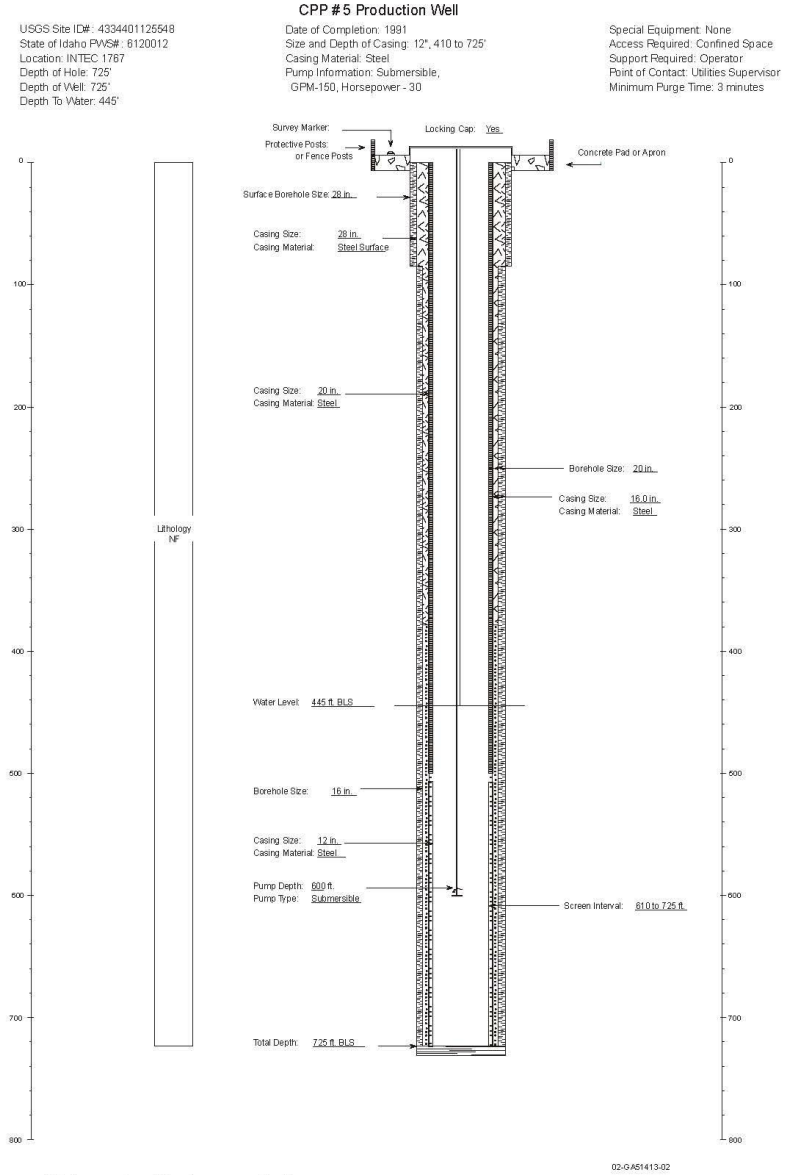


Figure E-8. Critical Infrastructure Test Range Complex production well No. 2.



NOTE: *Not required to be sampled.*

Figure E-9. Idaho Nuclear Technology and Engineering Center production well No. 4 (reference) WEL-UTI-504, P-UTI-660l.



NOTE: *Not required to be sampled.*

Figure E-10. Idaho Nuclear Technology and Engineering Center production well No. 5 (reference) WEL-UTI-505, P-UTI-214.

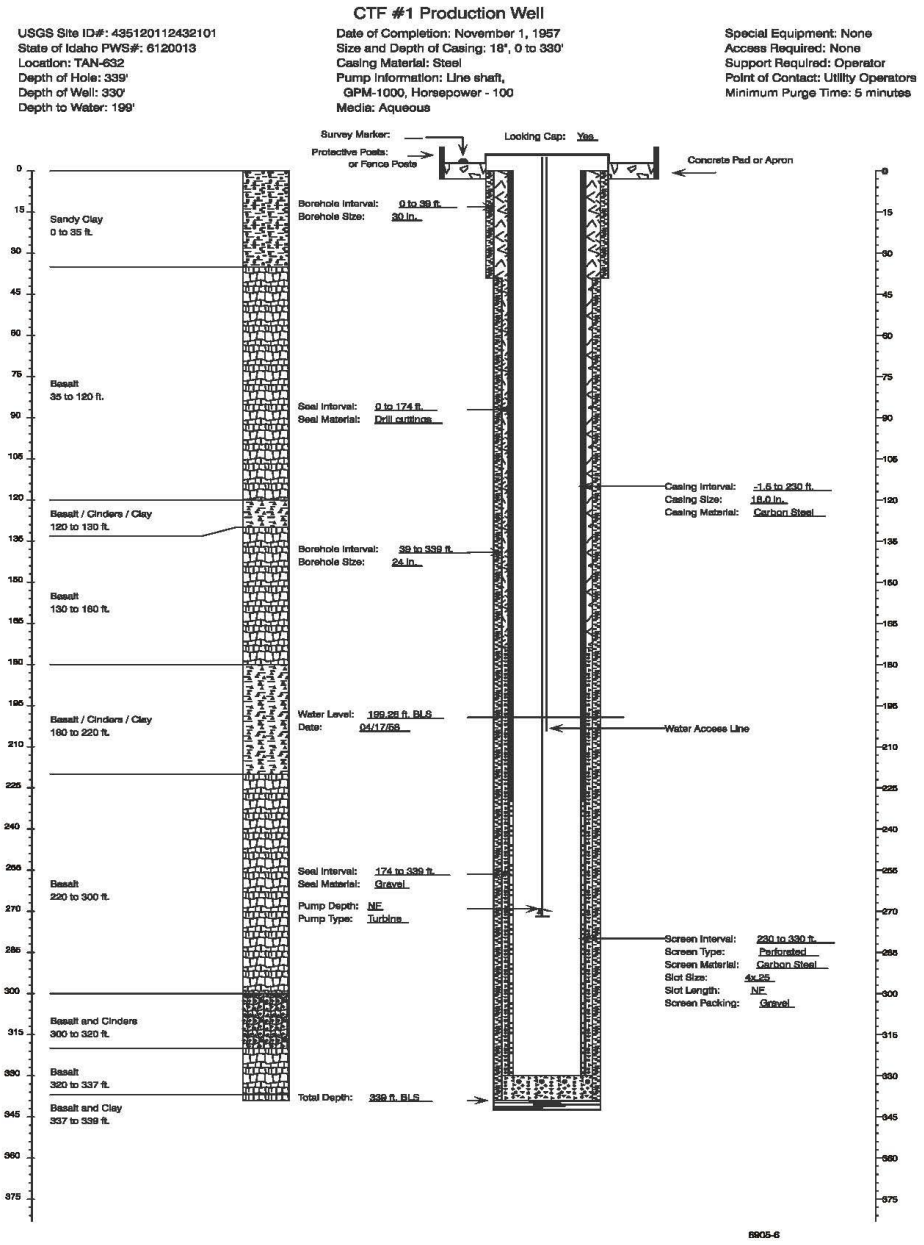


Figure E-11. Containment Test Facility production well No. 1.

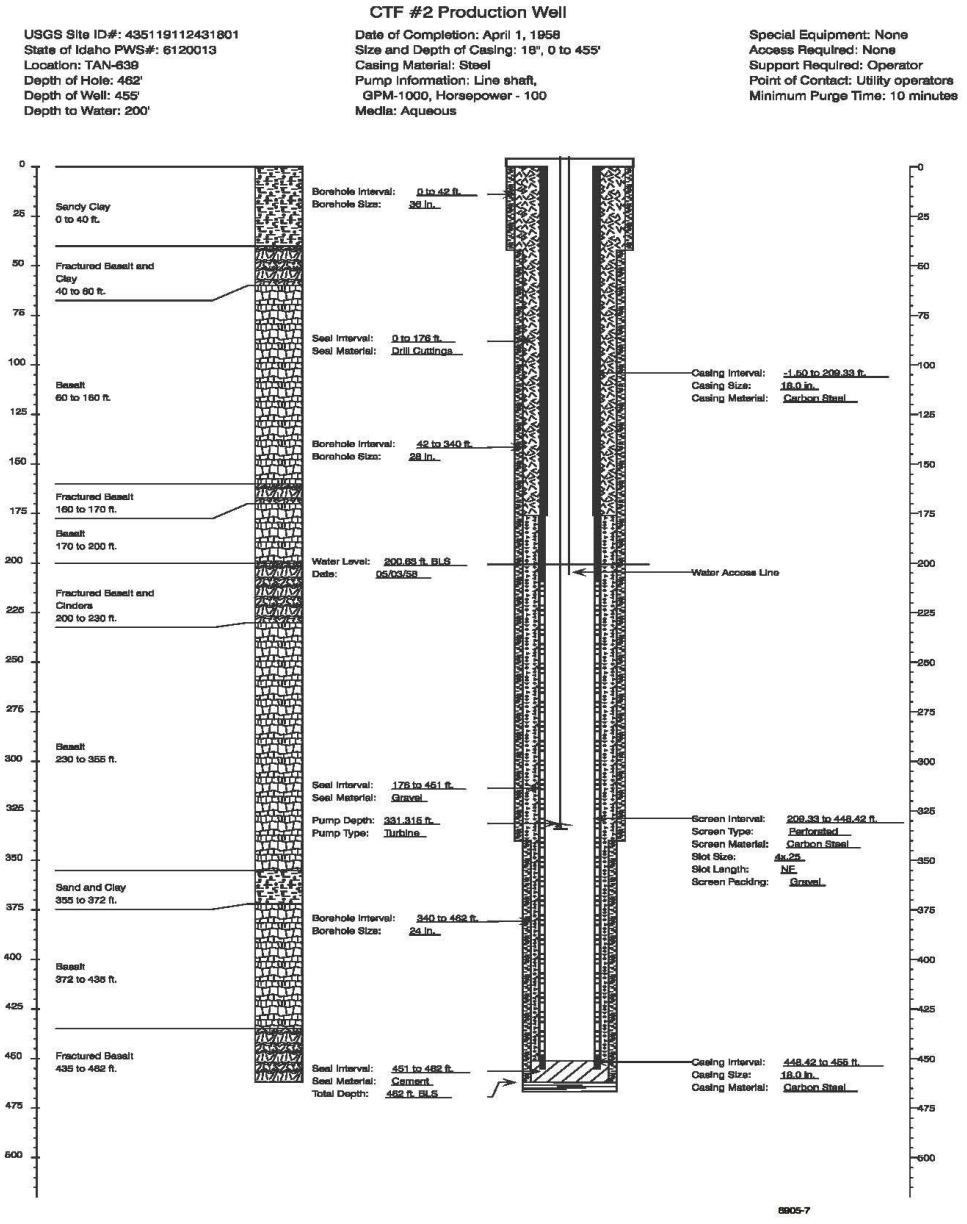
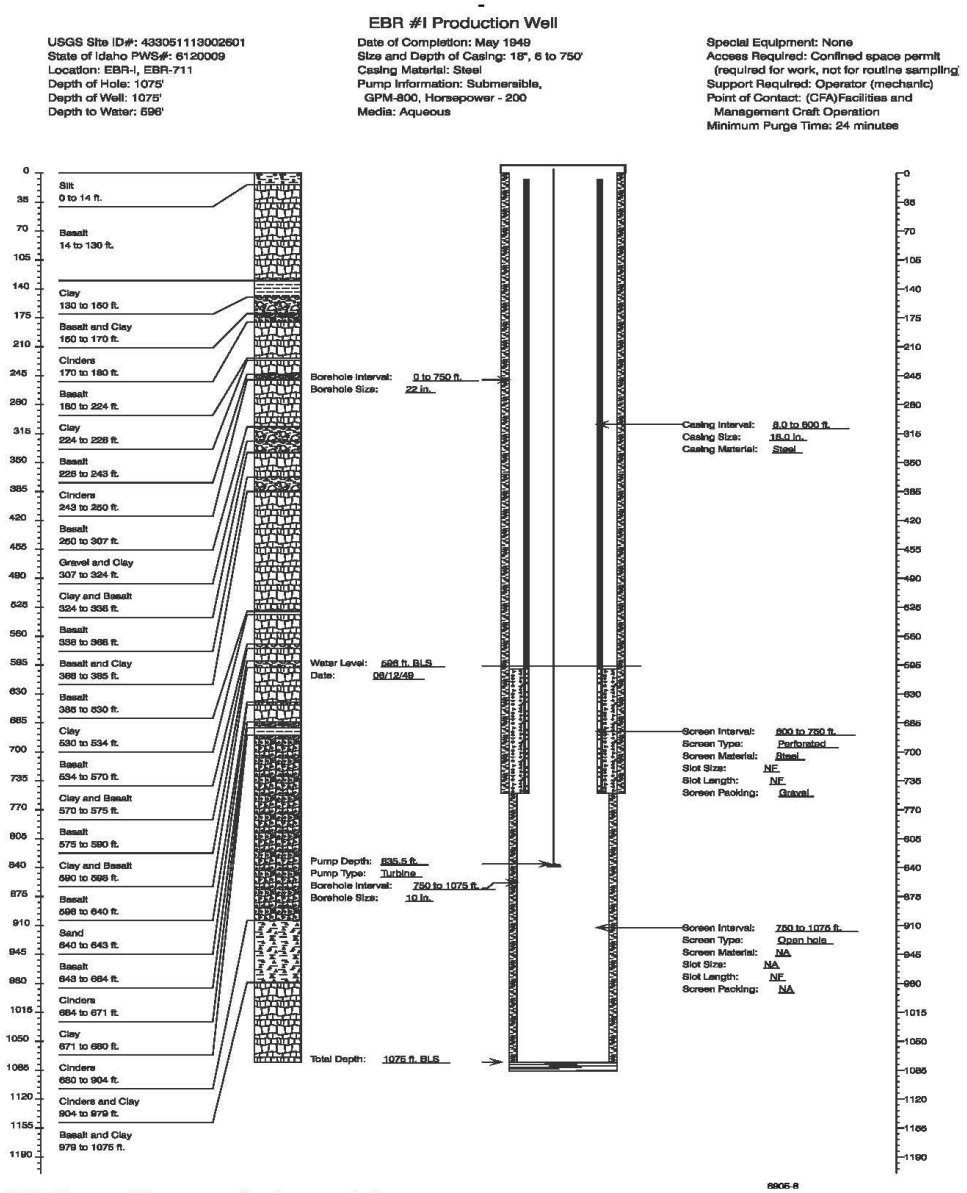


Figure E-12. Containment Test Facility production well No. 2.



NOTE: *Not required to be sampled.*

Figure E-13. Experimental Breeder Reactor-I production well.

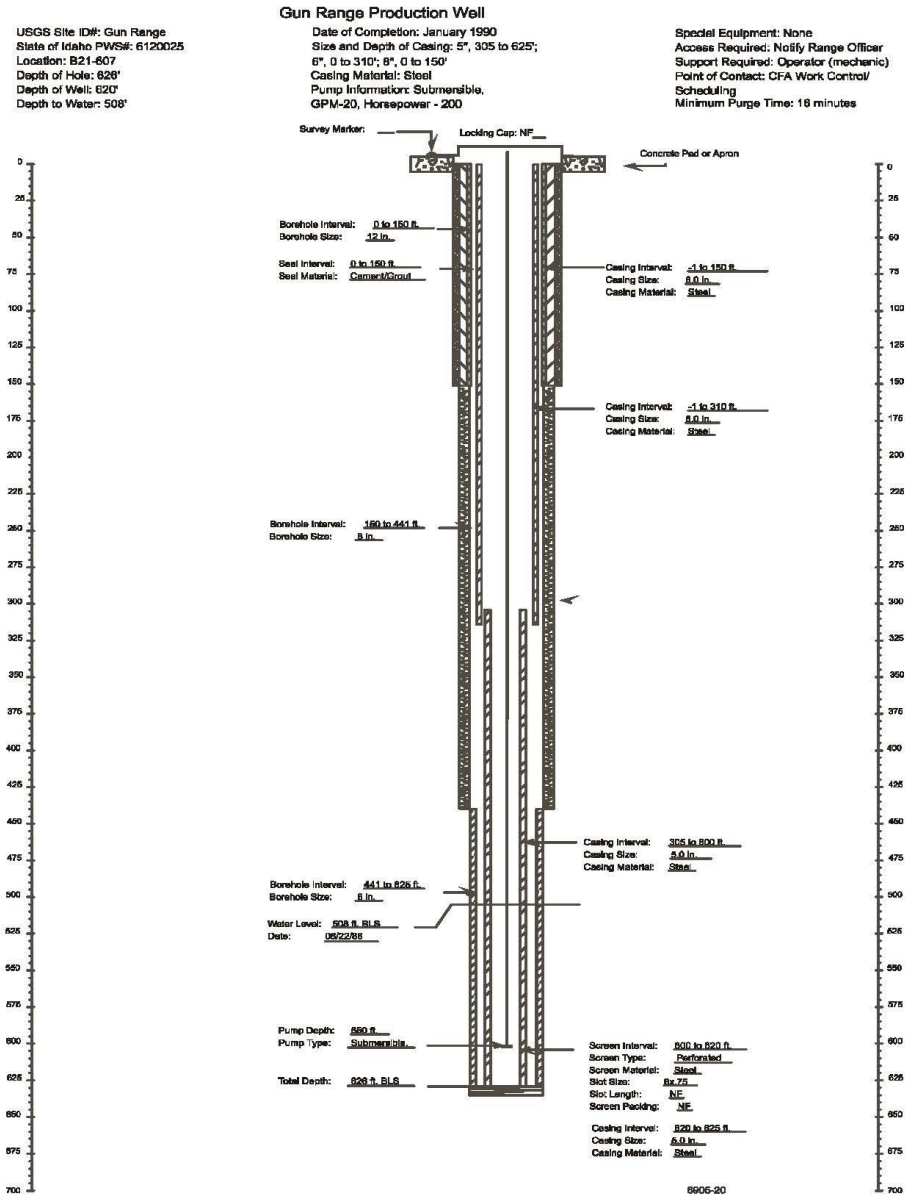


Figure E-14. Gun Range production well.

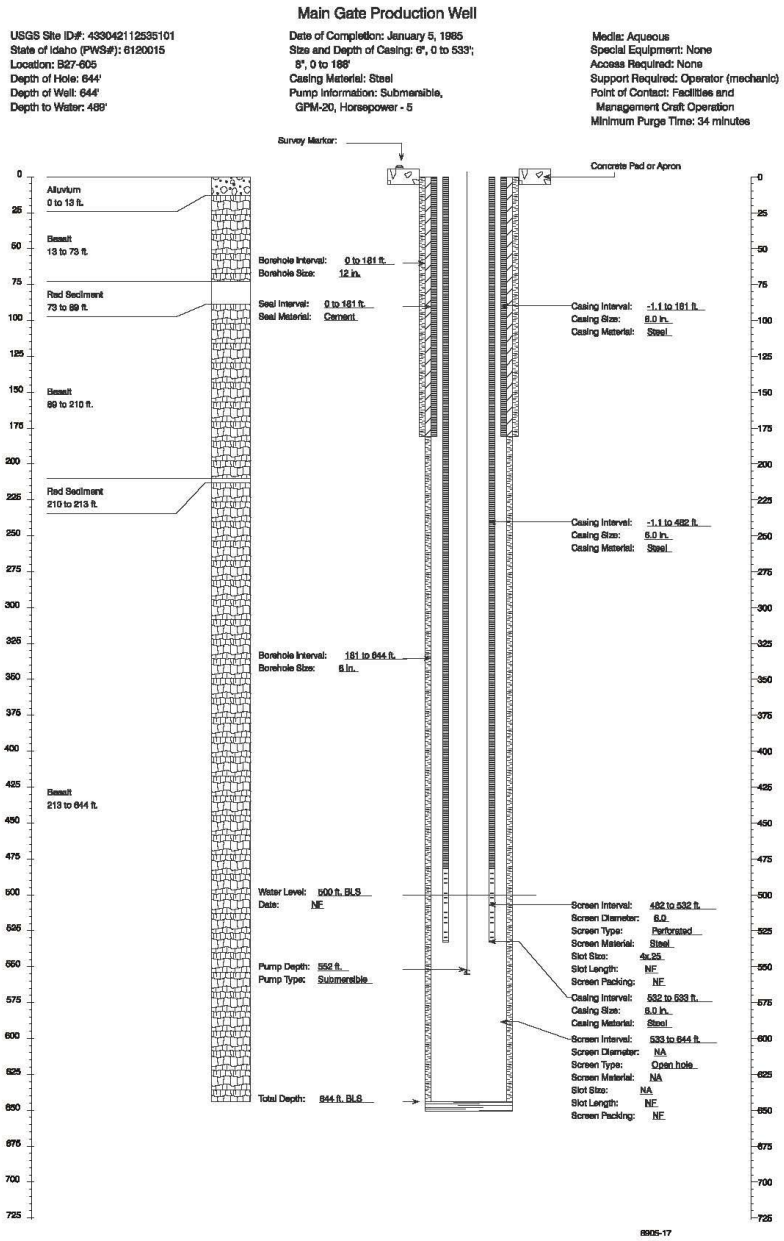


Figure E-15. Main Gate production well.

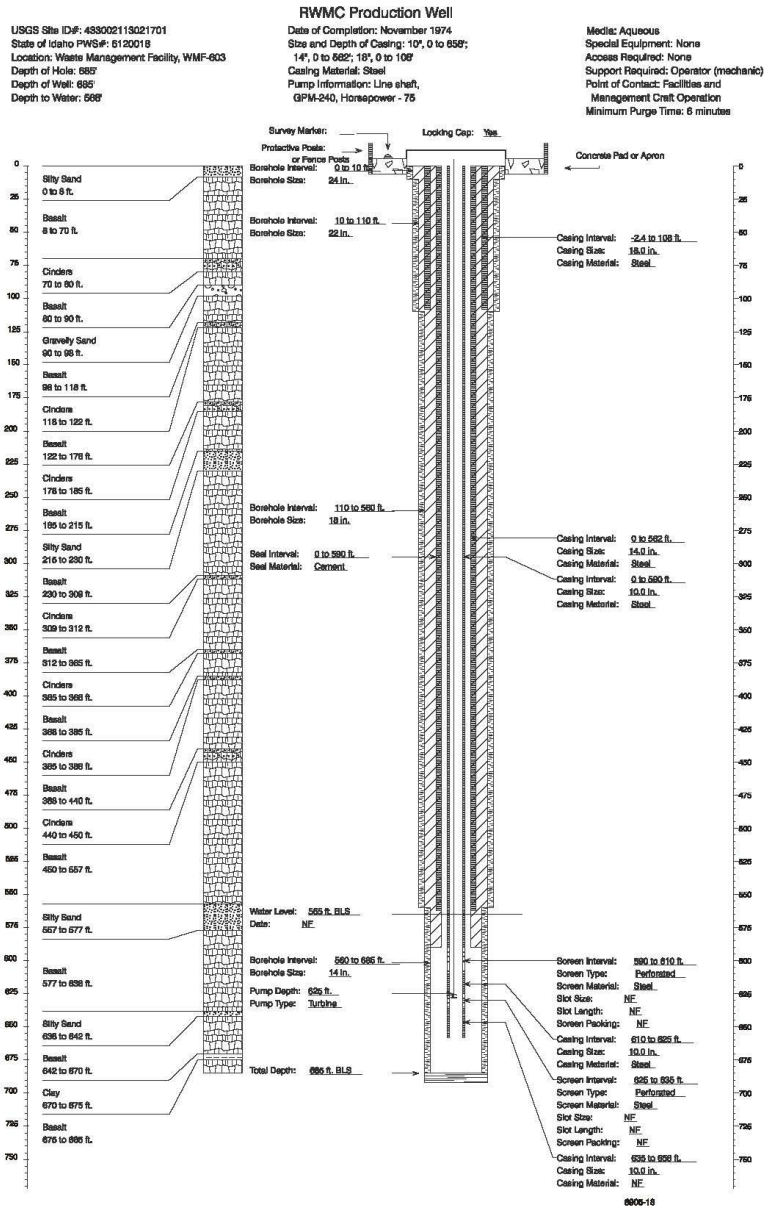


Figure E-16. Radioactive Waste Management Complex production well (reference).

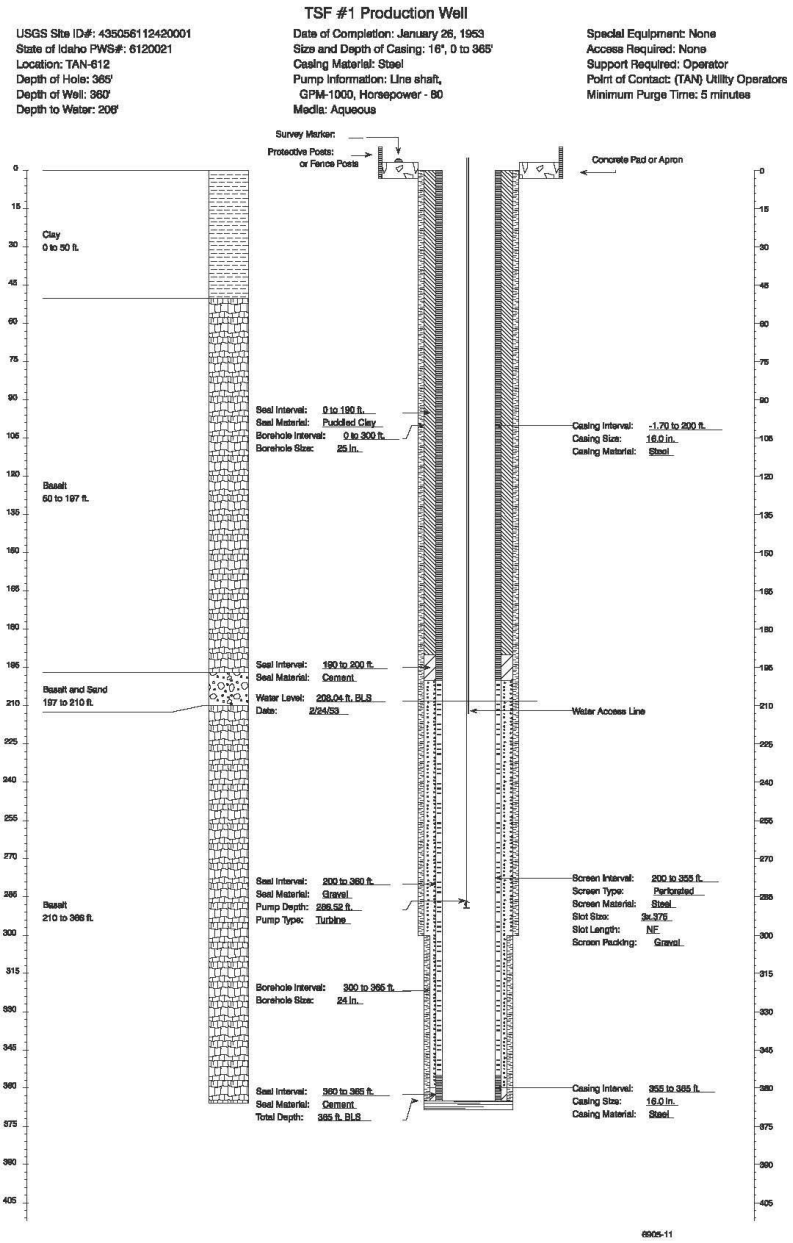


Figure E-17. Technical Support Facility production well No. 1.

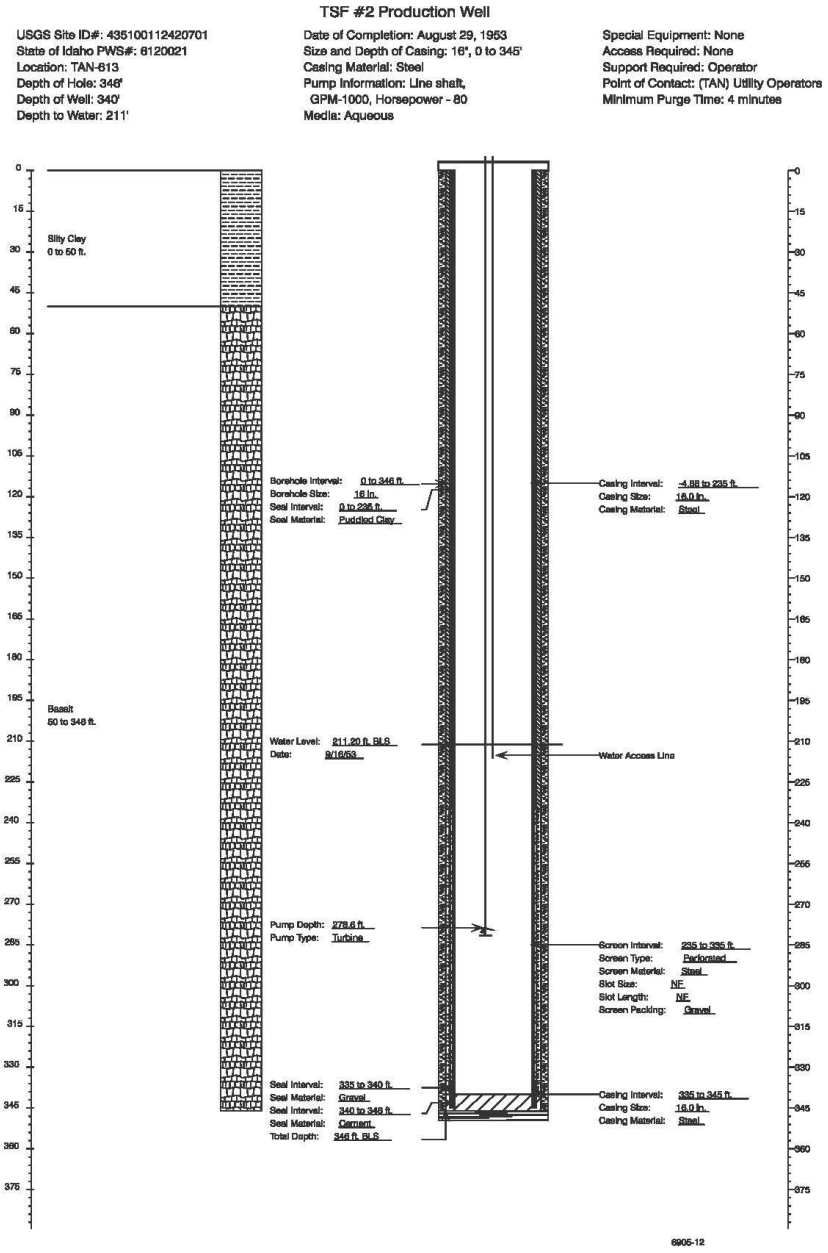


Figure E-18. Technical Support Facility production well No. 2.

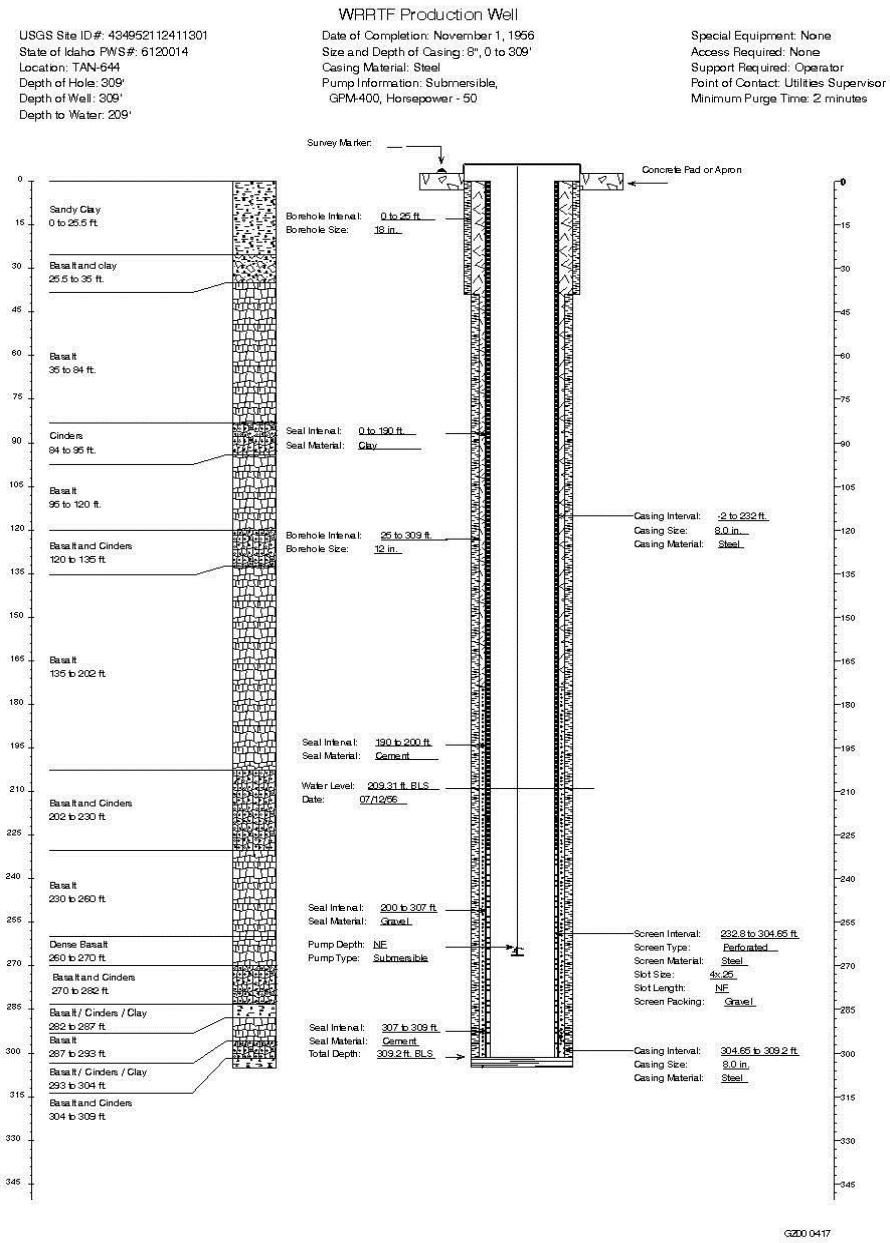


Figure E-19. Water Reactor Research Test Facility production well.

Appendix F

Procedure Basis

Step	Basis	Source Document	Citation
Section 2	Hazards and mitigations	This laboratory instruction and LI-355, "Working in Environmental Monitoring Services Sample Preparation Areas (SPA)"	
Section 1	Drinking water/production wells and distribution/manifold systems shall be sampled for organic and inorganic compounds	IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems"	Not applicable
Section 1	Federal drinking water regulations to ensure health and safety	40 CFR 141, "National Primary Drinking Water Regulations" 40 CFR 142, "National Primary Drinking Water Regulations Implementation" 40 CFR 143, "National Secondary Drinking Water Regulations"	Not applicable

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Plan

Idaho National Laboratory Drinking Water Monitoring Plan

The INL is a U.S. Department of Energy National Laboratory operated by Battelle Energy Alliance.

REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	02/02/2006	All	See DAR 503962. New document.
1	06/04/2007	All	See DAR 506307. General update.
2	03/03/2009	Various	See eCR 567296. Update.
3	01/21/2010	Various	See eCR 676316. Minor revisions.
4	03/11/2010	Various	See eCR 678555. Update.
5	09/14/2012	Various	See eCR 605841. Update from self-assessment surveillance.
6	04/29/2014	All	See eCR 622075. Revision.
7	04/25/2016	All	See eCR 639403.
8	04/06/2017	2.1 and Tables 2 and 3	See eCR 648439.
9	05/11/2017	Page 15	See eCR 650164. Minor revision. Changed B21-632 to B21-630.

CONTENTS

TABLES

ACRONYMS

AG	amber glass
ATR	Advanced Test Reactor
BEA	Battelle Energy Alliance, LLC
CFA	Central Facilities Area
CITRC	Critical Infrastructure Test Range Complex
COC	chain of custody
CTF	Containment Test Facility
DEQ	Idaho Department of Environmental Quality
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
DQO	data quality objective
DWML	drinking water monitoring lead
DWMP	Drinking Water Monitoring Program
EBR-I	Experimental Breeder Reactor-I
EPA	Environmental Protection Agency
ES&S	Environmental Support and Services
FTL	field team leader
G	glass
HAA5	haloacetic acid
HCL	hydrochloric acid
HDPE	high-density polyethylene
INL	Idaho National Laboratory
MCL	maximum contaminant level
MFC	Materials and Fuels Complex
P	polyethylene
PBF	Power Burst Facility
QA	quality assurance
QC	quality control
RHLLW	remote-handled low level waste
SDWA	Safe Drinking Water Act

SMCL	secondary maximum contaminant level
SOW	statement of work
TAN	Test Area North
TSF	Technical Support Facility
TTHMs	total trihalomethanes
VOC	volatile organic compound

1. PURPOSE/SCOPE

This document establishes the Idaho National Laboratory Drinking Water Monitoring Plan. It describes the aspects of monitoring and contains the drinking water sampling schedule, Environmental Protection Agency (EPA) methods used for analysis, and data quality objectives (DQOs). It summarizes the requirements established by the EPA and State of Idaho for water quality parameters and monitoring frequency. This plan also details the organizations responsible for implementing sample collection, sample analysis, quality assurance/quality control (QA/QC) requirements, documentation, and corrective action plans.

This plan meets the requirements (1) of a Category III QA Program Plan as defined by the EPA and requirements (2) in EPA QA/R-5, "EPA Requirements for Quality Assurance Project Plans." This plan is structured to meet the minimum regulatory requirements for monitoring drinking water systems under IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems." Monitoring is focused on INL Site drinking water systems and wells, which are multiple-use wells for individual use, fire safety, and drinking water. Monitoring of drinking water at INL is performed by Environmental Support and Services (ES&S) Monitoring Services personnel.

Table 1 provides a crosswalk between the elements of this plan and applicable EPA QA/R-5 elements.

Table 1. Crosswalk between PLN-8530 and EPA QA/R-5 elements.

PLN-8530		EPA QA/R-5	
Section	**Element**	**Section**	**Element**
	Title Page, Form 412.14	A1	Title and Approval Sheet
	Table of Contents	A2	Table of Contents
2	Program Description	A5	Problem Definition/Background
		A6	Project/Task Description
3	Organization and Responsibilities	A3	Distribution List
		A4	Project/Task Organization
		A8	Special Training/Certification
		A9	Documents and Records
4	Data Quality Objectives	A7	Quality Objectives and Criteria
5	Sampling Procedures	A8	Special Training/Certification
		B1	Sampling Process Design
		B2	Sampling Methods
6	Sample Custody	A7	Quality Objectives and Criteria
		B3	Sample Handling and Custody

Table 1. (continued).

PLN-8530		EPA QA/R-5	
Section	**Element**	**Section**	**Element**
7	Standardization Procedures and Frequency	A7	Quality Objectives and Criteria
		B7	Instrument/Equipment Calibration and Frequency
8	Analytical Procedures	B4	Analytical Methods
9	Data Validation and Reporting	A7	Quality Objectives and Criteria
		B9	Non-direct Measurements
		B10	Data Management
		D1	Data Review, Verification, and Validation
		D2	Verification and Validation Methods
		D3	Reconciliation with User Requirements
10	Internal Quality Control Checks	B2	Sampling Methods
		B5	Quality Council
		B6	Instrument/Equipment Testing, Inspection, and Maintenance
		B7	Instrument/Equipment Calibration and Frequency
		B9	Non-direct Measurements
11	Performance and System Assessments	C1	Assessments and Response Actions
12	Preventative Maintenance Procedures	B6	Instrument/Equipment Testing, Inspection, and Maintenance
		D3	Reconciliation with User Requirements
13	Corrective Action	C1	Assessments and Response Actions
13.2	Recordkeeping and Reporting	A9	Documents and Records
		B10	Data Management
14	Quality Assurance Reports to Management	A7	Quality Objectives and Criteria
		C2	Reports to Management

2. PROGRAM DESCRIPTION

2.1 General

The drinking water systems are monitored on a routine basis for bacteriological (coliform), chemical (organic and inorganic), and radiological constituents for compliance with federal and state regulations and to ensure that the water in these systems is safe for human consumption. In accordance with IDAPA 58.01.08, constituents with primary drinking water standards are monitored at least once every 3 years, unless a waiver from the Idaho Department of Environmental Quality (DEQ) has reduced the monitoring frequency.

Monitoring of drinking water systems is conducted at the following INL contractor-operated facilities/areas:

- Advanced Test Reactor (ATR) Complex (formerly the Reactor Technology Complex)
- Central Facilities Area (CFA)
- Containment Test Facility (CTF)
- Critical Infrastructure Test Range Complex (CITRC) (formerly the Power Burst Facility [PBF])
- Experimental Breeder Reactor-I (EBR-I)
- Gun Range
- Main Gate
- Materials and Fuels Complex (MFC) (formerly Argonne National Laboratory-West)
- Remote-Handled Low Level Waste (RHLLW) Disposal Facility
- Technical Support Facility (TSF).

INL Site drinking water systems are classified as either nontransient noncommunity or transient noncommunity water systems and are monitored in accordance with State of Idaho, EPA, and federal regulations. Nontransient noncommunity water systems are located at the ATR Complex, CFA, CTF, and MFC. Transient noncommunity water systems are located at CITRC, EBR-I, the Gun Range, the Main Gate, RHLLW, and TSF. Also, the RHLLW water system is regulated as a consecutive water system because it obtains its water from the ATR Complex water system.

The State of Idaho has primacy for implementing EPA drinking water regulations. Since State of Idaho and EPA monitoring regulations (40 CFR 141, "National Primary Drinking Water Regulations"; 40 CFR 142, "National Primary Drinking Water Regulations Implementation"; and 40 CFR 143, "National Secondary Drinking Water Regulations") are the same, IDAPA 58.01.08 is generally referenced in this plan.

2.2 Monitoring Objectives

The objectives of monitoring INL water systems are to comply with regulatory requirements, meet the technical objectives of this plan, and meet standards of good practice.

2.2.1 Regulatory Requirements

The objective of the regulatory requirements is to protect the health of workers and visitors at INL by ensuring that the drinking water does not expose them to contaminants that pose an unacceptable risk (exceed the maximum contaminant level [MCL]). The drinking water systems under INL jurisdiction will be monitored as nontransient or transient noncommunity water systems according to state regulations (IDAPA 58.01.08) and EPA regulations (40 CFR 141-143). Human health is protected by complying with drinking water regulations in DOE O 458.1, "Radiation Protection of the Public and the Environment."

IDAPA 58.01.08 provides regulatory limits that define maximum drinking water concentrations that protect human health. It incorporates by reference the federal limits in 40 CFR 141-143. IDAPA 58.01.08 requires that INL drinking water must meet the State of Idaho regulations to be in compliance. The regulations list the parameters to be analyzed and the analysis frequency. The scope of the regulations is to provide a degree of assurance that public drinking water systems are protected from contamination and maintained free from contaminants that may injure the health of the consuming public.

40 CFR 141–143 require all states to comply with the Safe Drinking Water Act (SDWA) set forth by the EPA and the state regulations must be as stringent as the federal regulations to be in compliance. The drinking water regulations for Idaho are as strict as those promulgated under the SDWA; therefore, the State of Idaho regulations have primacy.

DOE O 458.1 provides a level of protection for people consuming drinking water at INL. The level of protection should be no less than the equivalent of the confidence levels listed in 40 CFR 141. This policy is upheld whether INL is operated by DOE, or through a DOE contractor such as Battelle Energy Alliance, LLC (BEA).

Monitoring personnel must determine whether concentrations of parameters in supplied drinking water exceed MCLs specified in federal and state regulations. If concentrations are below MCLs, then no action is required. If concentrations exceed MCLs, then response actions, such

as confirmatory sampling and notification, will be taken as specified in the regulations.

2.2.2 Plan Technical Objectives

The technical objectives of this plan are to ensure monitoring is representative and accurate of the water systems and of water actually consumed at INL-operated facilities. In addition, the drinking water data will be verified and/or validated to ensure accurate results are reported.

2.2.3 Standards of Good Practice

The INL water system monitoring process is routinely evaluated and updated to the latest standards (e.g., American Water Works Association) through self-assessment and procedural and field activity audits.

2.3 Monitoring Basis

The basis for conducting monitoring of INL Site drinking water systems is to ensure that the drinking water is safe for consumption and meets federal and state regulations (MCLs are not exceeded).

2.3.1 Monitoring Locations

Monitoring locations currently consist of nine active drinking water systems, which are monitored on a routine basis (see Table 2). Depending on the specific regulatory requirements, the samples are collected either at the wellhead, at the manifold, or from the point of entry to the distribution system after any treatment. Table 3 lists the monitoring locations for the nine drinking water systems.

2.3.2 Type and Frequency of Sampling

INL contractor-operated water systems at the INL Site are monitored according to their classification. Water systems classified as nontransient noncommunity water systems are the ATR Complex, CFA, CTF, and MFC water systems. Water systems classified as transient noncommunity water systems are the CITRC, EBR-I, Gun Range, Main Gate, and TSF water systems. RHLLW is regulated as a consecutive water system.

The type and frequency of sampling of BEA drinking water systems are specifically stated in LI-361, "Sampling of INL Public Water Systems," and Table 3.

Table 2. Battelle Energy Alliance, LLC, drinking water wells at Idaho National Laboratory.

Facility/Area	Well	Building No.
ATR Complex/RHLLW	Well No. 5[1,2]	TRA-696
CFA	Well No. 1[1]	CFA-651
	Well No. 2[1]	CFA-642
CITRC	Well No. 1	PBF-602
	Well No. 2	PBF-614
CTF	Well No. 1	TAN-632
	Well No. 2	TAN-639
EBR-I	Well	EBR-711
Gun Range	Well	B21-607
Main Gate	Well	B27-605
MFC	Well[1]	MFC-754
	Well	MFC-756
TSF	Well No. 1	TAN-612
	Well No. 2	TAN-613

1. Wells that are monitored.
2. ATR Complex wells No. 1, 3, and 4 are used as backup drinking water wells.

Table 3. Idaho National Laboratory drinking water sampling locations and schedule.

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)	
ATR Complex	Distribution system	—	Bacteriological	2	Monthly (one sample is collected at TRA-608, valve P1-10-115)
				1	Quarterly[1]
	Well No. 5[2]	TRA-696	Nitrate	1	Annually[1]
			Primary drinking water parameters as listed in Table 4	1	As required
				1	Tri-annually[1,3]
			Radiological	1	Semi-annually[1]
	Valve P1-10-115	TRA-608	Nitrate	1	Annually[1]
			Primary drinking water parameters as listed in Table 4	1	As required
				1	Tri-annually[1,3]
			Radiological	1	Semi-annually[1]
	TRA-608	TRA-608	HAA5s	1	Annually between July 1 and September 30
			TTHMs	1	
	TRA-658	TRA-658	HAA5s	1	Annually between July 1 and September 30
			TTHMs	1	

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)	
CFA	Distribution system	—	Bacteriological	2	Monthly[4]
				1	Quarterly[1]
	CFA-609	CFA-609	HAA5s	1	Tri-annually between July 1 and September 30
			TTHMs	1	
	Manifold	CFA-1603	Nitrate	1	Annually[1]
			Primary drinking water parameters as listed in Table 4	1	As required
				1	Tri-annually[1,3]
			Radiological	1	Semi-annually[4]
			HAA5s	1	Tri-annually between July 1 and September 30
			TTHMs	1	
	Well No. 1	CFA-651	Radiological	1	Semi-annually[4]
	Well No. 2	CFA-642	Radiological	1	Semi-annually[4]
CITRC	Distribution system	—	Bacteriological	1	Monthly[4]
				1	Quarterly[1]
	Manifold	PBF-638	Nitrate	1	Annually[1]
			Radiological	1	Semi-annually[4]
CTF	Distribution system	—	Bacteriological	1	Monthly[4]
				1	Quarterly[1]
	Manifold	TAN-1612	Nitrate	1	Annually[1]
			Primary drinking water parameters as listed in Table 4	1	As required
				1	Tri-annually[1,3]
			Radionuclides	1	Semi-annually[4]
	TAN-678	TAN-678	HAA5s	1	Tri-annually between July 1 and September 30
			TTHMs	1	
EBR-I	Distribution system	—	Bacteriological	1	Quarterly[4]
				1	May, June, July, August, and September[1]
	Well	EBR-711	Nitrate	1	Annually[1]
	EBR-601	EBR-601	Radiological	1	Semi-annually[4]
Gun Range	Distribution system	—	Bacteriological	1	Monthly[4]
				1	Quarterly[1]
	Well	B21-607	Nitrate	1	Annually[1]
	B21-608	B21-608	Radiological	1	Semi-annually[4]
Main Gate	Distribution system	—	Bacteriological	1	Monthly[4]
				1	Quarterly[1]
	Well	B27-605	Nitrate	1	Annually[1]
	B27-603	B27-603	Radiological	1	Semi-annually[4]

Facility/Area	Sample Point	Building No.	Contaminant	Samples Collected (Minimum)	
MFC	Distribution system	—	Bacteriological	2	Monthly[4]
				1	Quarterly[1]
	Manifold	MFC-721	HAA5s	1	Annually between July 1 and September 30
			TTHMs	1	
	Manifold	MFC-754	Nitrate	1	Annually
			Primary drinking water parameters as listed in Table 4	1	As required
				1	Tri-annually[1,3]
			Radiological	1	Semi-annually
			HAA5s	1	Annually between July 1 and September 30
			TTHMs	1	
	Manifold	MFC-1740	Nitrate	1	Annually
			Primary drinking water parameters as listed in Table 4	1	As required
				1	Tri-annually[3]
			Radiological	1	Semi-annually
			HAA5s	1	Annually between July 1 and September 30
			TTHMs	1	
RHLLW	Distribution system	B21-630/631	Bacteriological	1	Monthly[4]
				1	Quarterly[1]
		B21-630/631	HAA5s	1	Annually between July 1 and September 30
		B21-630/631	TTHMs	1	Annually between July 1 and September 30
		B21-630/631	Lead and Copper	1	Tri-annually[1]
TSF	Distribution system	—	Bacteriological	1	Monthly[4]
				1	Quarterly[1]
	Well No. 2	TAN-613	VOCs	1	Annually[4]
			Nitrate	1	Annually[3]
	TSF-610	TSF-610	Radiological	1	Semi-annually

Key: HAA5 = haloacetic acid
TTHMs = total trihalomethanes
VOC = volatile organic compound.

1. Compliance samples.
2. ATR Complex wells No. 1, No. 3, and No. 4 are used as backup drinking water wells.
3. Waivers from DEQ can be applied for and reduce monitoring frequency from 3 years to 6 or 9 years.
4. Surveillance samples.

Table 4. Primary and secondary drinking water standards.

Type of Contaminant		MCL	Required Compliance Frequency	EPA-Approved Methods (Examples)
Bacteriological—40 CFR 141.21, 141.63, and Subpart Y, Revised Total Coliform Rule	Total coliform and E. Coli	If fewer than 40 samples per month collected, no more than one positive for total coliform and E. Coli	25–1,000 people: 1 sample per quarter 1,001–2,500 people: 2 samples per month	Multiple-tube fermentation, membrane filter technique, presence-absence coliform test, and minimal medium ONPG-MUG test also known as autoanalysis Colilert test
Disinfection by-products—40 CFR 141.12 and 141.30	(c) HAA5s (dibromoacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, and trichloroacetic acid)	0.60 mg/L	Annually (unless frequency reduced by DEQ) during one of the warmest months of the year (July–September)	552.2
	(c) TTHMs (sum of the concentrations of bromodichloromethane, dibromachloromethane, tribromomethane [bromoform], and trichloromethane [chloroform])	0.080 mg/L	Annually (unless frequency reduced by DEQ) during one of the warmest months of the year (July–September)	524.2
Inorganic—40 CFR 141.11, 141.23, and 141.62(b)	Arsenic	0.010 mg/L	Every 3 years	200.8
	Asbestos	7 million fibers per liter (>10µm)	Every 3 years	EPA-600/4-83-043, September 1993, 100.1, 100.2
	Barium	2 mg/L	Every 3 years	200.8
	Cadmium	0.005 mg/L	Every 3 years	200.8
	Chromium	0.1 mg/L	Every 3 years	200.8
	Fluoride	4 mg/L	Every 3 years	340.1, 340.2, 340.3, 380-75WE
	Lead	0.015 mg/L	Every 3 years	200.8
	Mercury	0.002 mg/L	Every 3 years	200.8
	Nitrate	10 mg/L (as nitrogen)	Annually	300.0
	Nitrite	1 mg/L (as nitrogen)	Every 3 years	353.2
	Total nitrite + nitrate	10 mg/L (as nitrogen)	Every 3 years	353.2
	Selenium	0.05 mg/L	Every 3 years	200.8

Table 4. (continued).

Type of Contaminant		MCL	Required Compliance Frequency	EPA-Approved Methods (Examples)
Inorganic—40 CFR 141.62(b) and 141.23	Antimony	0.006 mg/L	Once each compliance period (3 years)	200.8
	Beryllium	0.004 mg/L	Once each compliance period (3 years)	200.8
	Nickel (EPA, state requirement)	0.1 mg/L	Once each compliance period (3 years)	200.8
	Thallium	0.002 mg/L	Once each compliance period (3 years)	200.8
	Cyanide	0.2 mg/L	Once each compliance period (3 years)	335.4
Inorganic—40 CFR 141.80–141.91	Copper	1.3 mg/L (TT)[1]	Semiannually first year; annually for 2 years; then if action levels are not exceeded, reduced to once every 3 years	200.8
	Lead	0.015 mg/L (TT)[1]	Semiannually first year; annually for 2 years; then if action levels are not exceeded, reduced to once every 3 years	200.8
Organic—40 CFR 141.61(c)	(a) Chlorinated hydrocarbons:			
	Endrin	0.0002 mg/L	Once each compliance period (3 years)	—
	Lindane	0.0002 mg/L	Once each compliance period (3 years)	—
	Methoxychlor	0.04 mg/L	Once each compliance period (3 years)	—
	Toxaphene	0.003 mg/L	Once each compliance period (3 years)	—
	(b) Chlorophenoxys:			
	2,4-D	0.07 mg/L	Once each compliance period (3 years)	—
	2,4-DB	No MCL	Once each compliance period (3years)	—
	2,4,5-TP Silvex	0.05 mg/L	Once each compliance period (3 years)	—
Pesticides and other synthetic organic compounds—40 CFR 141.24, 141.40, and 141.61(c)	2,3,7,8-TCDD (Dioxin)	0.00000003 mg/L	Once each compliance period (3 years)	1613
	Alachlor	0.002 mg/L	Once each compliance period (3 years)	525.2
	Aldricarb	0.003 mg/L	Once each compliance period (3 years)	531.1
	Aldicarb sulfone	0.002 mg/L	Once each compliance period (3 years)	531.1

Table 4. (continued).

Type of Contaminant		MCL	Required Compliance Frequency	EPA-Approved Methods (Examples)
Pesticides and other synthetic organic compounds—40 CFR 141.24, 141.40, and 141.61(c) (cont.)	Aldicarb sulfoxide	0.004 mg/L	Once each compliance period (3 years)	531.1
	Atrazine	0.003 mg/L	Once each compliance period (3 years)	525.2
	Benzo(a)pyrene (PAH)	0.0002 mg/L	Once each compliance period (3 years)	525.2
	Carbofuran	0.04 mg/L	Once each compliance period (3 years)	531.1
	Chlordane	0.002 mg/L	Once each compliance period (3 years)	505, 508
	Dalapon	0.2 mg/L	Once each compliance period (3 years)	515.1, 515.3
	Di(2-ethylhexyl) (adipate)	0.4 mg/L	Once each compliance period (3 years)	525.2
	Di(2-ethylhexyl) (phthalate)	0.006 mg/L	Once each compliance period (3 years)	525.2
	Dibromochloropropane	0.0002 mg/L	Once each compliance period (3 years)	504.1, 524.2
	Dinoseb	0.007 mg/L	Once each compliance period (3 years)	515.1, 515.3
	Diquat	0.02 mg/L	Once each compliance period (3 years)	549.2
	Endothall	0.1 mg/L	Once each compliance period (3 years)	548.1
	Ethylene dibromide	0.00005 mg/L	Once each compliance period (3 years)	504.1, 524.2
	Glyphosate	0.7 mg/L	Once each compliance period (3 years)	547
	Heptachlor	0.0004 mg/L	Once each compliance period (3 years)	525.2
	Heptochlor epoxide	0.0002 mg/L	Once each compliance period (3 years)	525.2
	Hexachlorobenzene	0.001 mg/L	Once each compliance period (3 years)	525.2
	Hexachlorocyclo-pentadiene	0.05 mg/L	Once each compliance period (3 years)	525.2
	Oxamyl (Vydate)	0.2 mg/L	Once each compliance period (3 years)	531.1
	Pentachlorophenol	0.001 mg/L	Once each compliance period (3 years)	515.1, 515.3, 525.2

Table 4. (continued).

Type of Contaminant		MCL	Required Compliance Frequency	EPA-Approved Methods (Examples)
Pesticides and other synthetic organic compounds—40 CFR 141.24, 141.40, and 141.61(c) (cont.)	Picloram	0.5 mg/L	Once each compliance period (3 years)	515.1, 515.3
	Polychlorinated biphenyls	0.0005 mg/L	Once each compliance period (3 years)	505, 508, 508A
	Simazine	0.004 mg/L	Once each compliance period (3 years)	525.2
Radionuclides—40 CFR 141.15, 141.16, 141.25, and 141.26	Radium-226	—[2]	Once each compliance period (3 years)	304, 305, 903.1
	Radium-228	—[2]	Once each compliance period (3 years)	304, 305, 904
Radionuclides—DOE O 458.1	Gross alpha particle activity (including radium-226, but excluding radon and uranium): Beta particle/photon radioactivity	15 pCi/LShall not produce annual dose equivalent to total body or internal organ greater than 4 mrem/yr	Once each compliance period (3 years)	900 Series
	Iodine-129	1 pCi/L	Surveillance	900 Series
	Radium-226/228	5 pCi/L	Surveillance	302, 900
	Strontium-90	8 pCi/L	Surveillance	900 Series
	TC-99	900 pCi/L	Surveillance	900 Series
	Uranium	0.030 mg/L	Surveillance	900 Series
Secondary drinking water standards—40 CFR 143.3 and 143.4	Aluminum	0.05 to 0.2 mg/L	Every 3 years (recommended)	200.7, 200.8
	Chloride	250 mg/L	Every 3 years (recommended)	Potentiometric, 300.0
	Color	15 color units	Every 3 years (recommended)	Platinum cobalt, 110.2
	Copper	1.0 mg/L	Every 3 years (recommended)	200.8
	Corrosivity	Noncorrosive	Every 3 years (recommended)	Langlier index
	Fluoride	2.0 mg/L	Every 3 years (recommended)	340.1, 340.2. 340.3, 380-75WE
	Foaming agents	0.5 mg/L	Every 3 years (recommended)	Methylene Blue, 5540C
	Iron	0.3 mg/L	Every 3 years (recommended)	200.7
	Manganese	0.05 mg/L	Every 3 years (recommended)	200.8
	Odor	3 threshold odor number	Every 3 years (recommended)	Consistent series, 140.1

Table 4. (continued).

Type of Contaminant		MCL	Required Compliance Frequency	EPA-Approved Methods (Examples)
Secondary drinking water standards—40 CFR 143.3 and 143.4 (cont.)	pH	6.5 to 8.5	Every 3 years (recommended)	150.1, 150.2
	Silver	0.1 mg/L	Every 3 years (recommended)	200.8
	Sulfate	250 mg/L	Every 3 years (recommended)	300.0
	Total dissolved solids	500 mg/L	Every 3 years (recommended)	Total residue
	Zinc	5 mg/L	Every 3 years (recommended)	200.8
VOCs—40 CFR 141.24 and 141.61(a)	1,1-Dichloroethylene	0.007 mg/L	Once each compliance period (3 years)	524.2
	1,1,1-Trichloroethane	0.2 mg/L	Once each compliance period (3 years)	524.2
	1,1,2–Trichloroethane	0.005 mg/L	Once each compliance period (3 years)	524.2
	1,2-Dichloroethane	0.005 mg/L	Once each compliance period (3 years)	524.2
	1,2-Dichloropropane	0.005 mg/L	Once each compliance period (3 years)	524.2
	1,2,4–Trichlorobenzene	0.07 mg/L	Once each compliance period (3 years)	524.2
	Benzene	0.005 mg/L	Once each compliance period (3 years)	524.2
	Carbon tetrachloride	0.005 mg/L	Once each compliance period (3 years)	524.2
	cis-1,2-Dichloroethylene	0.07 mg/L	Once each compliance period (3 years)	524.2
	Dichloromethane	0.005 mg/L	Once each compliance period (3 years)	524.2
	Ethylbenzene	0.7 mg/L	Once each compliance period (3 years)	524.2
	Monochlorobenzene	0.1 mg/L	Once each compliance period (3 years)	524.2
	o-Dichlorobenzene	0.6 mg/L	Once each compliance period (3 years)	524.2
	para-Dichlorobenzene	0.075 mg/L	Once each compliance period (3 years)	524.2
	Styrene	0.1 mg/L	Once each compliance period (3 years)	524.2
	Tetrachloroethylene	0.005 mg/L	Once each compliance period (3 years)	524.2

Table 4. (continued).

Type of Contaminant		MCL	Required Compliance Frequency	EPA-Approved Methods (Examples)
VOCs—40 CFR 141.24 and 141.61(a) (cont.)	Toluene	1 mg/L	Once each compliance period (3 years)	524.2
	Trichloroethylene	0.005 mg/L	Once each compliance period (3 years)	524.2
	trans-1,2-Dichloroethylene	0.1 mg/L	Once each compliance period (3 years)	524.2
	Xylenes (total)	10 mg/L	Once each compliance period (3 years)	524.2
	Vinyl chloride	0.002 mg/L	Once each compliance period (3 years)	524.2

Key: TT = treatment technique.

1. Sample collected at consumer's tap. If 90th percentile is exceeded, treatment is required.
2. If radium-226 exceeds 3 pCi/L, then radium-228 needs to be analyzed.

2.3.3 Primary and Secondary Drinking Water Parameters

Table 4 lists parameters regulated by the State of Idaho under authority of the SDWA. State of Idaho regulations incorporate the federal limits by reference. Parameters that have been proven to cause cancer or other health problems in laboratory animals at high concentrations are regulated by primary drinking water standards. Primary drinking water standards set MCLs for these constituents. Parameters that have not been proven to cause adverse health effects, but can cause aesthetic problems in a water supply, are regulated by secondary MCLs (SMCLs).

Table 4 also lists the monitoring frequencies required by the regulations. Parameters with primary MCLs are required to be monitored at least once every 3 years, as a minimum, which is the compliance period (e.g., 20011–2013 and 2014–2016). Many parameters require more frequent sampling during an initial period to establish a baseline. Subsequent monitoring frequency depends on that baseline. Parameters with SMCLs are recommended to be monitored once every 3 years.

Table 3 shows the drinking water schedule for each water system at INL. A sample tracking system is used to track the status of samples collected. A calendar is also kept in the files to track each month's planned sampling to ensure all samples are collected.

2.3.4 Surveillance Samples

Many parameters are monitored more frequently during the initial period to establish a surveillance sample baseline. Subsequent monitoring schedules are established using the baseline information. All samples collected for surveillance are evaluated to ensure the sampling objectives are being met.

If the existence of contaminants is known, surveillance monitoring is conducted more frequently than regulations require; these additional samples are also surveillance samples. For example, the Drinking Water Monitoring Program (DWMP) monitors more frequently for bacteriological analysis because of historical problems with bacteriological contaminants.

If an MCL or SMCL is exceeded on a surveillance sample, the same guidelines as those for a compliance sample are followed, except for notification. Notification of surveillance samples is tracked internally.

3. PROGRAM ORGANIZATION AND RESPONSIBILITIES

The importance of efficient project management is recognized and implemented through well-defined job descriptions, areas of responsibility, and individual training plans.

The program environmental lead is responsible for implementing established policies and procedures and reviewing individual training plans for the work organization in accordance with LWP-12003, "New and Transferred Employee Training Requirements."

The drinking water monitoring lead (DWML) is responsible for providing technical direction to support personnel in conformance with requirements, ensuring that the plan and implementing documentation meet the regulatory requirements, monitoring work schedules to ensure compliance with project commitments, and reviewing all reports and data to ensure conformance with this plan. The DWML is also responsible for notifying area landlords if an MCL is exceeded.

The field team leader (FTL) or DWML is responsible for ensuring that all field activities are conducted according to the requirements of this plan and LI-361. The FTL is responsible for establishing a system of recordkeeping; recommending standards for purchasing; coordinating sampling and analysis; ensuring that assigned personnel are adequately trained to perform required sampling; and in concert with the DWML, identifying and resolving problems using the requirements of this plan. The FTL and DWML are responsible for ensuring that field QA/QC procedures are adhered to.

4. DATA QUALITY OBJECTIVES

The decisions to be made, along with the sample design and frequency, are defined by federal and state drinking water regulations, as discussed in Subsection 2.2.1. A brief discussion of the DQO process steps and application of the process are provided below.

4.1 Problem Statement

The problem is to protect the health of workers and visitors at INL by ensuring that the water consumed does not expose them to contaminants that pose an unacceptable risk. An unacceptable risk is defined as an exceedance of a stated MCL.

As stated in Subsection 2.2.1, drinking water systems at INL have been defined as transient noncommunity or nontransient noncommunity water systems. It is required that monitoring be performed according to the classification of the water system. Ref. Table 4 for contaminants of concern and applicable regulatory MCLs.

4.2 Decision Identification and Inputs to Decision

Monitoring of drinking water is conducted at INL to determine if the drinking water sources supplied at INL exceed MCLs for regulated drinking water contaminants.

4.2.1 Input

To evaluate whether the contaminants exceed stated MCLs, sampling personnel must routinely sample each active drinking water system at INL and obtain the concentration of each contaminant of concern using the appropriate analytical method of analysis.

Only EPA-approved drinking water methods listed in 40 CFR 141-143 will be used for drinking water analyses, and laboratories used for analyses must be certified for drinking water analyses, by the state of residence, and have reciprocity with the State of Idaho.

4.2.2 Action

1. If the concentrations exceed 90% of the MCL but do not exceed the MCL, the response actions are determined by established best management practices. Examples of best management practices include monitoring the source water (e.g., samples at the wellhead), resampling the original sampling point, checking sampling techniques, and reviewing laboratory QA/QC.

2. If the concentrations exceed the MCL, the response actions are determined by the federal and state regulations. These required regulatory-driven response actions include confirmation sampling and notification and are addressed in Subsection 13.1.

4.3 Definition of Boundaries

The spatial boundary is defined by the fact that the decision will individually apply to each of the INL-operated water supply systems located within the INL Site boundary, as listed in Section 2.

The sample collection schedule is determined per regulations and is identified in Subsection 2.3.

4.4 Data Quality Assurance/Quality Control

4.4.1 Tolerance Limits on Decision Errors

For the DWMP, the decision errors are deciding (1) that the true contaminant concentration from a single event has exceeded the MCL when it has not, and (2) that the true concentration has not exceeded an MCL when it actually has.

The consequences of deciding that the true contaminant concentration has exceeded an MCL when it has not includes the cost of confirmation samples, unwarranted notification, issue tracking, cause analysis, notifications, MCL violations, and possible psychological stress imposed on affected workers or visitors.

The consequences of deciding that the true contaminant concentration has not exceeded an MCL when it actually has includes possible harm to persons who continue to drink from the water source and possible liabilities for future damages.

Validation and/or verification are performed to ensure that project and laboratory QA/QC requirements have been met. Section 13 addresses corrective action that will be taken if these criteria are not met.

4.4.1.1 Precision

The regulations specify what analytical methods are to be used for each contaminant of concern by certified laboratories. Precision is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Duplicate samples are used as indicators of the precision of sampling techniques and laboratory analytical methods. Three types of duplicates are used: field replicates, laboratory recounts, and laboratory duplicates. Field replicates measure the precision of the entire sampling and analysis process. Laboratory recounts measure the precision of laboratory radiation counting procedures only. Laboratory duplicates measure the precision of laboratory analysis.

QA/QC samples may be submitted to participating laboratories at the discretion of the media lead. Relative percent difference determined from field duplicates must be within 35% or less for 90% of the field duplicates that have positive results greater than five times the method detection limit.

In specifying particular analytical methods to obtain data to meet permit requirements, the EPA also specified the tolerable level of laboratory analytical uncertainty in data. Analytical methods specify that certain QC checks be performed during sample analysis and specify the limits within which the QC checks must fall. ES&S Monitoring Services passes these requirements to analytical laboratories through the laboratory statement of work (SOW). The laboratory is required to include the results of QC measurements with the analytical results returned to ES&S Monitoring Services. The data validation process involves checking the QC data against the method-specific limits to ensure that QA goals were met. Data flags are used to mark analytical data that either do not conform to QC limits or may be questionable because of laboratory findings. In this way, the quality of laboratory data is identified so that the level of uncertainty is known during data interpretation.

4.4.1.2 Accuracy

Accuracy is a determination of how close the measurement is to the true value. For concentrations of parameters in drinking water, blind spike samples are used to determine the accuracy of laboratory analyses. Within each calendar year, 10% of the samples collected (excluding bacteria samples) will be QA/QC samples, which include blind spikes. All blind spike percent recoveries must fall within the standards range.

4.4.1.3 Representativeness

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is ensured through use of established sampling locations, schedules, and procedures for field sample collection, preservation, and handling.

4.4.1.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions. The DQOs address completeness for laboratory and field operations. The criterion for completeness by laboratories is that at least 90% of the surveillance and 100% of the compliance samples submitted annually must be successfully analyzed and reported according to specified procedures. Similarly, the criterion for field data collection under ES&S Monitoring Services is that at least 90% of the surveillance and 100% of the compliance samples must be successfully collected on an annual basis and reported according to the specified procedures. If a completeness criterion is not met, the problem will be evaluated, and it will be determined whether the quality of the remaining data is suspect and whether a corrective action is needed either in the field collection or laboratory analysis.

4.4.1.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured through the use of (1) laboratory instructions for sample collection, preparation, and handling; (2) approved analytical methods for laboratory analyses; and (3) consistency in reporting procedures.

4.4.2 Optimization of Design

The frequency of sampling and number of samples collected per event is determined from the regulations. Therefore, the repetitive part of the DQO process introduced in this step does not apply. As defined in the regulations, the results of a single measurement collected and analyzed by the prescribed methods can initiate action.

5. SAMPLING PROCEDURES

Generating quality data begins with preparing plans (documentation) and training personnel on the plans, followed by collecting samples, and analyzing them with approved standard methods. An integral part of the process is adhering to a QA program, which is implemented at each stage of the process to reduce the chances of error. Samples must be collected in a manner to avoid any alteration of their composition during sampling. Representative samples are obtained by (1) following a proven sampling protocol per program laboratory instruction, and (2) following a cleanliness control protocol for sampling equipment and bottles.

5.1 Sample Collection Procedures and Methods

The DWMP uses the following:

- LI-355, "Working in Environmental Monitoring Services Sample Preparation Areas (SPA)"
- LI-359, "Cleaning of Environmental Monitoring Services Sampling Equipment"
- LI-361
- MCP-8523, "Managing Hazardous and Non-Hazardous Samples"
- PLN-8515, "Data Management Plan for the INL Environmental Support and Services Monitoring Services Program."

5.2 Sample Containers and Sample Preservation

Monitoring personnel will follow EPA-established sample container cleaning protocols, follow sample container type requirements, and use the required sample preservatives to ensure that errors in sampling do not result from cross-contamination. Table 5 lists examples of recommended bottle types, sample preservation requirements (American Chemical Society grade reagents or better), and holding times. Before sampling, the laboratory provides specific requirements.

Table 5. Examples of recommended containers, preservation, and hold times (not all inclusive).

Test	Contaminant	Minimum Sample Volume/Container	Preservation[1]	Maximum Hold Time
Bacterial	Coliform, fecal and total	100 mL, 150-mL Colilert container	Cool, 4°C, 0.008% $Na_2S_2O_3$	30 hours
	General bacteria	100 mL, 150-mL Colilert container	Cool, 4°C, 0.008% $Na_2S_2O_3$	30 hours
Inorganic	Chloride	125 mL, P, HDPE	None required	28 days
	Chromium, total	500 mL, P, HDPE	Cool, 4°C	180 days
	Color	125 mL, P, HDPE	Cool, 4°C	48 hours
	Cyanide	1,000 mL, G	Cool, 4°C NaOH to pH >12	14 days
	Fluoride	250 mL, P, HDPE	None required	28 days
	Hardness	250 mL, P, HDPE	HNO_3 to pH <2	180 days
	Nitrate as N	125 mL, P	Cool, 4°C	48 hours
	Nitrite as N	125 mL, P	Cool, 4°C	48 hours
	Total nitrate + nitrite	125 mL, P	H_2SO_4 to pH <2	28 days
	Total dissolved solids	250 mL, P, HDPE	Cool, 4°C	7 days
Metals	Antimony	500 mL, P, G	HNO_3 to pH <2	180 days
	Arsenic	500 mL, P	HNO_3 to pH <2	180 days
	Barium	500 mL, P, G	HNO_3 to pH <2	180 days
	Beryllium	500 mL, P, G	HNO_3 to pH <2	180 days
	Cadmium	500 mL, P, G	HNO_3 to pH <2	180 days
	Copper	500 mL, P	HNO_3 to pH <2	180 days
	Iron	500 mL, P	HNO_3 to pH <2	180 days
	Lead	500 mL, P	HNO_3 to pH <2	180 days
	Manganese	500 mL, P	HNO_3 to pH <2	180 days
	Mercury	250 mL, P, G	HNO_3 to pH <2	28 days
	Selenium	500 mL, P, G	HNO_3 to pH <2	180 days
	Silver	500 mL, P	HNO_3 to pH <2	180 days
	Sodium	500 mL, P	HNO_3 to pH <2	180 days
	Thallium	500 mL, P, G	HNO_3 to pH <2	180 days
	Zinc	500 mL	HNO_3 to pH <2	180 days

Table 5. (continued).

Test	Contaminant	Minimum Sample Volume/Container	Preservation[1]	Maximum Hold Time
Other analytes	Sulfate	125 mL, P, HDPE	Cool, 4°C	28 days
	Corrosivity	100 mL, P, G, HDPE	None	14 days
	Odor	125 mL, G, P	None	48 hours
	Foaming agents (MBAS)	500 mL, P, G, HDPE	Cool, 4°C	7 days
	Temperature	60 mL P, G, HDPE	None	Analyze in the field
	Turbidity	125 mL, P, HDPE	Cool, 4°C	48 hours
	Perchlorate	250 mL HDPE	None required	28 days
Organic	Chlorinated acid (2, 4-DB)	1-L G, Teflon-lined cap	Cool, 4°C HCL to pH <2 for chlorinated water system	Collection to extraction: 14 days
			0.5-mL $Na_2S_2O_3$ for nonchlorinated system	Extraction to analysis: 14 days
	HAA5s	3, 50-mL AG vial, Teflon-lined cap	Cool, 4°C, 5-mg ammonium chloride	Collection to extraction: 14 days
				Extraction to analysis: 14 days
	Polychlorinated biphenyls	1-L AG, Teflon-lined cap	Cool, 4°C	Collection to extraction: 14 days
				Extraction to analysis: 30 days
	Pesticides[2]	2-L AG, Teflon-lined cap	Cool, 4°C	Collection to extraction: 14 days
				Extraction to analysis: 30 days
	TTHMs	3, 40-mL G, Teflon-lined cap	Cool, 4°C 0.008% ascorbic acid for chlorinated water systems and HCL to pH <2; HCL to pH <2 for nonchlorinated water system	14 days
	VOCs (chlorinated system)	3, 40-mL G, Teflon-lined cap	Cool, 4°C 0.008% ascorbic acid and HCL	14 days
	VOCs (nonchlorinated system)	3, 40-mL G, Teflon-lined cap	Cool, 4°C, HCL to pH <2	14 days
Radiological	Alpha, beta	1,000 mL, P, G	HNO_3 to pH <2	180 days
	Iodine-129	4 L and/or 1 gal, AG, P	None	180 days (AG)
				28 days (P)
	Radon-222	3 × 40 mL AG	Cool, 4°C	14 days
	Strontium-90	1,000 mL, P, G	HNO_3 to pH <2	180 days
	Tritium	250 mL, P, G	None	180 days

Key: AG = amber glass
G = glass
HCL = hydrochloric acid
HDPE = high-density polyethylene
P = polyethylene.

1. Follow instructions from the laboratory or the specific method for proper preservation.
2. Endrin, lindane, methoxychlor, toxaphene.

5.3 Sample Security

The chain of custody (COC) procedures (MCP-8523) discussed in Section 6 will be followed to ensure that errors will not result from fraud and sabotage.

5.4 Sample Packaging

Samples are packaged according to MCP-8523. Samples are packaged in a cooler with sufficient cooling material (double bagged ice or equivalent) to maintain sample integrity. Glass bottles are wrapped with bubble wrap, and the cooler is filled with an absorbent material approximately equal to twice the sample volume liquid.

5.5 Sample Transport

Samples are shipped by overnight carrier to ensure sample integrity. MCP-8523 describes the proper sample handling, packaging, and shipping requirements for environmental samples collected.

5.6 Sample Storage

Prior to shipping, samples are stored at the appropriate temperature, with preservatives, locked with sampler-controlled access. Samples are stored by the subcontract laboratory as described in the laboratory's QA plan to ensure sample integrity.

5.7 Recordkeeping

Records of all drinking water samples shall be retained according to drinking water regulations. See Subsection 13.2 for additional information.

5.7.1 Sample Identifier

Sample identification numbers, labels, and COC forms are generated by means of the sample analysis plan table builder and are provided by the Analytical Services contracting lead or designee.

5.7.2 Electronic Logbook

The electronic logbook is a feature within the SAP application to allow electronic storage of all information regarding sampling activities, approval of the completeness and correctness of the sampling information, and creation of PDF reports for submittal to records storage. The following information will be recorded in the electronic logbook:

- Date, time, and place of sampling
- Field QC samples as applicable
- Data from field analyses
- Observations about site and samples
- Information about any activities extraneous to sampling activities.

6. SAMPLE CUSTODY

All drinking water samples will be collected under COC. Sample handling and analysis must strictly follow COC procedures and documentation to ensure sample integrity and that the analytical data can be used. The sample custody protocols used by ES&S Monitoring Services sampling programs are those recommended in EPA SW-846, *Test Methods for Evaluation of Solid Waste*, and outlined in MCP-8523. Prior to shipping, samples are stored at the appropriate temperature, with preservatives, and locked with sampler-controlled access.

6.1 Definition

A sample is considered to be in an individual's custody if the sample is (1) in the physical possession or view of the responsible party, (2) secured by the responsible party to prevent tampering, or (3) placed in a restricted area by the responsible party.

6.2 Transfer of Chain of Custody

Samples must be accompanied by a COC form. When the possession of samples is transferred, the individual relinquishing the samples signs and records the date and time on the COC form. The individual receiving the samples repeats the procedure. This record represents the official documentation for all transfers of the sample custody until the samples have arrived at the laboratory. For samples shipped by third-party carrier services, such as Federal Express, the FEDEX tracking number becomes part of the COC record.

6.3 Laboratory Custody Procedures

The laboratory follows laboratory COC procedures. The laboratory shall return the original or a copy of the COC form, along with the data package, to ES&S Monitoring Services showing the date and signature of the person receiving the samples.

7. STANDARDIZATION PROCEDURES AND FREQUENCY

Standardization of sampling equipment is required to ensure that the equipment is operating correctly and functioning at the proper sensitivity to meet established reporting limits.

7.1 Laboratory Instrumentation

Standardization and calibration procedures and frequencies for laboratory analytical equipment are specifically listed in EPA analytical methods. Compliance with method-specific calibration procedures is required in the SOW and task order SOW for analytical contracts between BEA and the performing laboratories. Laboratory compliance with method requirements is checked during independent laboratory assessments conducted for the DWMP or during laboratory certification by the state and confirmed by data validation.

Only laboratories that have instruments that are dedicated for drinking water analyses are utilized. Also, laboratories must have separate refrigerators for drinking water samples that have a high risk of cross-contamination between other samples (e.g., VOCs).

7.2 Field Instrumentation

Field instrumentation is not used, other than for chlorine testing. The chlorine test kit does not require standardization.

8. ANALYTICAL PROCEDURES

Laboratory Certifications. All drinking water analyses used for compliance purposes must be completed by a laboratory that is certified by the State of Idaho or a laboratory that has reciprocity with the State of Idaho (IDAPA 58.01.08.100.10, "Approved Laboratories"). In addition, all drinking water methods used by the laboratory must be EPA approved or equivalent, as listed in 40 CFR 141-143 (see Table 4).

9. DATA VALIDATION AND REPORTING

Data verification and validation instructions are addressed in PLN-8510, "Planning and Management of Environmental Support and Services Monitoring Services Activities," and internal validation procedures.

9.1 Data Evaluation

Data evaluation is the process of verifying that reportable data accurately reflect the measurement value. The evaluation process includes verifying instrument readings and calculations, reviewing QA/QC, evaluating field performance, and reviewing the data package for consistency with the requirements in the SOW or task order SOW. All data will be evaluated.

9.2 Data Assessment

Data assessment is performed by comparing the results to MCLs.

9.3 Data Reporting

Data generated from sampling activities is reported in a variety of ways. Information reports contain a summary of data with associated data evaluation and assessment comments. Also, statistical analyses are performed on the data using commercial software packages. Monthly or quarterly reports are generated throughout the year, and a data synopsis is generated for the annual report.

9.3.1 Reporting Units

Reporting units used for each parameter will be consistent with laboratory reporting forms. Conversion factors will be included for comparison with units specified in federal and state regulations.

9.3.2 Required Reporting

ES&S Monitoring Services provides data, if needed, for compliance samples to the State of Idaho to meet reporting requirements of IDAPA 58.01.08.150, "Reporting, Public Notification, Recordkeeping," with a copy to the DOE Idaho Operations Office (DOE-ID) (see Appendix A). Reporting requirements are implemented in the following:

- LI-361
- LWP-8000, "Environmental Instructions for Facilities, Processes, Materials and Equipment"
- LWP-8100, "Preparation, Certification, and Transmittal of INL Environmental Permit Applications and Reports."

The following reports are provided:

- Results of all monitoring and analyses required under State of Idaho regulations within the first 10 days following the end of the monitoring period or within the first 10 days following the month in which the sample results were received, whichever time is shortest
- A representative copy of each type of public notice distributed, published, posted, or made available to the persons served by the water system or to the media within 10 days of the completion of each notification
- Coordination information for MCL violations with ES&S for notification and reporting.

Surveillance sample(s) (noncompliance) results are tracked internally.

The effected personnel at a facility are notified by the media lead or DOE-ID according to LWP-8000 and LI-361 of the following:

- MCL violations
- A variance or exemption, granted by the State of Idaho, which allows any MCL to be exceeded
- Failure to comply with a schedule issued by the State of Idaho pursuant to a variance or exemption to an MCL
- Failure to perform any monitoring required by federal or state regulations.

All public notifications are coordinated with the DOE-ID Public Affairs Office.

9.3.2.1 Regulated and Unregulated Volatile Organic Compounds

VOC results are compared to the MCLs by averaging the results for the previous four quarters of monitoring, unless a water supply system is only required to collect one sample annually. If an MCL is exceeded, the State of Idaho and consuming public will be notified per IDAPA 58.01.08.

Water treatment or alternative water supplies may be required if the MCL is exceeded and will be initiated in accordance with applicable regulations and management evaluation as described in Section 13.

9.3.2.2 Inorganic Parameters

If the MCLs for any inorganic contaminants are exceeded (excluding nitrate), the State of Idaho and consuming public will be notified per IDAPA 58.01.08.

If the MCL for nitrate is exceeded, another sample must be collected within 24 hours, and the average of the two samples must be used to test compliance and determine appropriate notification requirements per IDAPA 58.01.08.150.02, "Public Notification of Drinking Water Violations."

Water treatment or alternative water supplies may be required if the MCL is exceeded. The organization operating the well will initiate corrections in accordance with applicable regulations and management evaluation.

9.3.2.3 Organic Parameters

If the MCLs for organic parameters not included in Subsection 9.3.2.1 are exceeded, the State of Idaho and consuming public will be notified per IDAPA 58.01.08.

Water treatment or alternative water supplies may be required if the MCL is exceeded. The organization operating the well will initiate corrections in accordance with applicable regulations and management evaluation.

9.3.2.4 Bacteriological Parameters

If the MCL for coliform is exceeded, the State of Idaho and area landlords will be notified, and three additional samples will be collected within 24 hours according to LI-361, LWP-8000, and IDAPA 58.01.08.

Water treatment or alternative water supplies may be required if the MCL is exceeded. The organization operating the water system will initiate corrections in accordance with applicable regulations and management evaluation.

9.3.2.5 Radiological Parameters

If the MCLs for radiological contamination are exceeded, the State of Idaho and consuming public will be notified within 48 hours (IDAPA 58.01.08).

Water treatment or alternative water supplies may be required if the MCL is exceeded. The organization operating the water system will initiate corrections in accordance with applicable regulations and management evaluation.

9.3.2.6 Secondary Drinking Water Standards

Secondary drinking water standards control contaminants in drinking water that primarily affect aesthetic qualities relating to the public acceptance of drinking water. At considerably higher concentrations of these contaminants, health implications may also exist. The regulations are not federally enforceable, but are intended as guidelines for the states (40 CFR 143.1). The only secondary drinking water standard that requires notification and compliance is an exceedance of fluoride. Exact wording for notification and additional requirements from 40 CFR 143.5 shall be followed.

9.3.3 Annual Report

An annual report will be generated. The annual report contains summarized drinking water monitoring data for the calendar year. Parameters of interest or exceeded in the drinking water at BEA facilities at INL are reported in the annual report.

10. INTERNAL QUALITY CONTROL CHECKS

The DWMP monitors data quality with internal QC checks in accordance with IDAPA 58.01.08.

10.1 Field Activities

The QA/QC samples are included with samples to assess field activities and laboratory performance. The types and frequencies of submissions are covered in LI-361. In addition, self-assessments are periodically conducted by someone not specifically associated with the sampling process.

10.2 Laboratory Activities

The analytical laboratory will follow EPA-approved or equivalent drinking water monitoring methods to prepare and analyze laboratory samples. Analytical data is compared to MCLs by use of certified laboratories or laboratories that have reciprocity with the State of Idaho and appropriate analytical methods. Analytical methods are specified in 40 CFR 141-143. Analytical results are validated by the Sample Analysis and Management organization.

11. PERFORMANCE AND SYSTEM ASSESSMENTS

Self-Assessments. A self-assessment is a systematic check to determine whether personnel are complying with the requirements outlined and referenced in this plan and the individual program laboratory instruction. The scheduling frequency of field activity assessments is the responsibility of the ES&S Monitoring Services program manager. This is accomplished by implementing LWP-13730, "Performance Assurance and Assessment." The self-assessment schedule is tracked in the companywide Integrated Assessment Schedule Database. Any issues from a self-assessment are identified, and response actions are scheduled and tracked in the Issue Communication and Resolution Environment in accordance with LWP-13830, "Control of Non-Conforming Items," and LWP-13840, "Issues Management."

12. PREVENTIVE MAINTENANCE PROCEDURES

Field instruments are backed up by a functionally equivalent instrument in case of a catastrophic instrument failure. Also, as a preventive measure, an adequate supply of bottles, preservatives, and miscellaneous sampling supplies are kept in the sample preparation area.

Analytical laboratories have specific preventive maintenance procedures documented within their specific QA program.

13. CORRECTIVE ACTION

The identification, cause, and corrective actions for conditions adverse to quality are documented and reported to appropriate levels of management as discussed in implementing procedures. Subsequently, the cause of any adverse condition that affects compliance with the applicable technical or QA/QC requirements is determined, and action is taken to preclude its recurrence. Nonconforming items are handled per LWP-13830. Corrective actions are handled as described in LWP-13840.

If problems occur, the QA program provides systematic procedures and corrective actions are entered in LabWay to resolve problems and restore proper function to the analytical system. Corrective action procedures are described in Subsection 13.3.

13.1 Maximum Contaminant Level Exceeded

If the MCL for any contaminant is exceeded on a single sample (routine compliance), DWMP personnel implement LI-361 (summarized as follows) to determine if alternative potable water sources are required:

- Additional samples shall be collected to conform to regulations and confirm the MCL violation
- Proper notifications shall be made according to applicable regulations and company procedures
- An evaluation of the situation shall be performed by management to determine when water treatment or alternative water supplies are required
- ES&S Monitoring Services shall provide technical assistance for determining the source of contamination, corrective actions, and follow-up sampling requirements.

If the MCL for a contaminant is exceeded, DWMP personnel shall make proper notifications to area landlords.

13.2 Recordkeeping and Reporting

In addition to the recordkeeping practices listed in Subsection 5.7, the following information will be kept:

- Records of actions taken to correct violations of MCLs
- Copies of all written reports, summaries, or communications relating to sanitary surveys
- Records concerning a variance or exemption granted to the system.

E-mail communications between ES&S personnel, DOE, and the State of Idaho should be forwarded to ENVAFF@inl.gov to be entered into EDMS.

In addition to the reporting requirements listed in Subsection 9.3.2, ES&S Monitoring Services, if needed, will provide DOE-ID with a representative copy of each type of notice distributed, published, posted, or made available to the persons served by the water system or to the media within 10 days of the completion of each public notification.

13.3 Laboratory and Programmatic Quality Control

QC samples are used to measure the performance of the analytical laboratory and the overall sampling program. Method requirements for analytical QC are published in EPA methods, and conformance to the method requirements is documented by data validation. Field QC samples (duplicates, equipment blanks) are used to assess the introduction of bias and uncertainty from the entire sampling and analysis process. Programmatic goals for field QC samples are presented in Section 4. Corrective action procedures are implemented when samples do not meet QA/QC established standards.

Field Corrective Action(s). The FTL or media lead are responsible for ensuring that field QA/QC procedures are followed. If a situation develops that may jeopardize the integrity of the samples, the FTL or media lead will document the situation, possible impacts to the DQOs of the program, and corrective actions taken. The situation and impacts on the DQOs of the program will be described in the annual report.

14. QUALITY ASSURANCE REPORTS TO MANAGEMENT

14.1 Reporting System

The QA reporting system is a valuable tool for measuring the overall effectiveness of the QA program. It is used to evaluate the program design, identify problems and trends, and plan for future needs. Results of all self-assessments are presented to the ES&S Monitoring Services manager and media lead.

Compliance issues with any requirement or instruction are managed per LWP-13840.

14.2 Plan Revision and Control

All procedures associated with drinking water monitoring are revised and controlled per LWP-1201, "Document Management."

15. REFERENCES

40 CFR 141, "National Primary Drinking Water Regulations," U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

40 CFR 141, "National Primary Drinking Water Regulations," Subpart Y, Revised Total Coliform Rule, U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

40 CFR 142, "National Primary Drinking Water Regulations Implementation," U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

40 CFR 143, "National Secondary Drinking Water Regulations," U.S. Code of Federal Regulations, Office of the Federal Register, current issue.

DOE O 458.1, "Radiation Protection of the Public and the Environment," U.S. Department of Energy, current issue.

EPA QA/R-5, "EPA Requirements for Quality Assurance Project Plans," U.S. Environmental Protection Agency, current issue.

EPA QAMS-005/80, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. Environmental Protection Agency, current issue.

EPA SW-846, Test Methods for Evaluation of Solid Waste, U.S. Environmental Protection Agency, current issue.

IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems," Idaho Administrative Procedures Act, current issue.

IDAPA 58.01.08.100.10, "Approved Laboratories," Idaho Administrative Procedures Act, current issue.

IDAPA 58.01.08.150, "Reporting, Public Notification, Recordkeeping," Idaho Administrative Procedures Act, current issue.

IDAPA 58.01.08.150.02, "Public Notification of Drinking Water Violations," Idaho Administrative Procedures Act, current issue.

LI-355, "Working in Environmental Monitoring Services Sample Preparation Areas (SPA)," Idaho National Laboratory, current revision.

LI-359, "Cleaning of Environmental Monitoring Services Sampling Equipment," Idaho National Laboratory, current revision.

LI-361, "Sampling of INL Public Water Systems," Idaho National Laboratory, current revision.

LWP-1201, "Document Management," Idaho National Laboratory, current revision.

LWP-8000, "Environmental Instructions for Facilities, Processes, Materials and Equipment," Idaho National Laboratory, current revision.

LWP-8100, "Preparation, Certification and Transmittal of INL Environmental Permit Applications and Reports," Idaho National Laboratory, current revision.

LWP-12003, "New and Transferred Employee Training Requirements," Idaho National Laboratory, current revision.

LWP-13730, "Performance Assurance and Assessment," Idaho National Laboratory, current revision.

LWP-13830, "Control of Non-Conforming Items," Idaho National Laboratory, current revision.

LWP-13840, "Issues Management," Idaho National Laboratory, current revision.

MCP-8523, "Managing Hazardous and Non-Hazardous Samples," Idaho National Laboratory, current revision.

PLN-8510, "Planning and Management of Environmental Support and Services Monitoring Services Activities," Idaho National Laboratory, current revision.

PLN-8515, "Data Management Plan for the INL Environmental Support and Services Monitoring Services Program," Idaho National Laboratory, current revision.

Appendix A

Department of Energy Idaho Operation Office Reporting Contacts

The Idaho National Laboratory Environmental Monitoring Program will provide data to the State of Idaho to meet reporting requirements of IDAPA 58.01.08, "Idaho Rules for Public Drinking Water Systems," with a copy to the Department of Energy Idaho Operations Office (DOE-ID). Reporting contacts to DOE-ID are as follows:

Vanica Dugger-Primary
Technical Support Division
DOE, Idaho Operations Office
1955 Fremont Avenue
Mail Stop 1216
Idaho Falls, ID 83401

R. M. Kauffman-Alternate
Technical Support Division
DOE, Idaho Operations Office
1955 Fremont Avenue
Mail Stop 1216
Idaho Falls, ID 83401

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Appendix G

Dead Leg Flushing

FRM-1835
Rev. 0
07/14/16

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

PM Justification/Change Tracking Number: AR # 1318					
Initiated by: A. R. Prather	63363	12/20/16	Phone 3-7473		
Change Type – Select all that apply					
☐ Frequency Change	☐ Scope Change	☐ Retire PM	☐ New PM	☒ Data Update (MEL, Asset Suite, PM Basis)	☐ Suspend PM
Component Data (Attach list if bulk data. For example, design change adding a number of new components to MEL)					
Building B21-631	MEL System 2211	MEL Equipment ID(s) PW-HOV-1	Equipment Name Potable Water Supply Line to RHLLW	Critical Equipment ☒ Yes ☐ No	
Asset Suite Data (if known)					
Model Work Order 236781	Frequency 6 M	Critical PM ☒ Yes ☐ No	Grace Period -30 +0 days		

Task Description and/or Changes (SP-20.2.5 MFC Preventive/Predictive Maintenance Program-Supplement to MCP-6201) Include major tasks and important details of what should be included on the PM. This will include a suggested frequency for the associated task.

NOTE: This revision updates a reference no longer applicable to this flushing process. It also reduces the volume of water required for the flush as a result of the change in references.

- Perform semi-annual flush of the potable water supply line to Remote Handled Low Level Waste (RHLLW) facility blow-off station with a minimum flushing velocity of 2.5 fps until 1 pipe volume of water has been flushed through the line.
- Per SPC-1860, the 4" line is PVC, AWWA C900, Class 200, which has an ID of 4.114". An inside diameter of 4.114" equates to 104 GPM at 2.5 fps. Flow a minimum of 104 GPM for a minimum of 21 minutes to ensure compliance with IDAPA 58.01.08.542.09.

PM Basis

- For regulatory, include specific section (TSR, Authorization Basis, Regulatory, Commitment, Codes, etc.)
- For non-regulatory, explain the PM technical basis for the PM change. Examples: Common failure modes, industry standards, best practices and vendor recommendations

State of Idaho IDAPA 58.01.08, Section 542.09.

Company requirement from LWP-8000, Section 4.12

Proposed Start Date and Justification:

Based on completion of construction and activation of component.

Engineering Technical Basis Review			
System Engineer	Print A. R. Prather	Signature A. R. Prather	Date 12/20/16
System Engineering Manager	Print J. A. Krause	Signature J. A. Krause	Date 1/4/16
Operations Review			
Comments:			

MFC Preventive Maintenance Justification (PMJ) for Work Control
(SP-20.2.5)

Operations: NFM/OM/FM	Print Pam Crane	Signature Pam Crane	Date 1-4-17
Maintenance Review			
Cost-Benefit (For New PM Only)		N/A for regulatory driven PM ☒	
Comments:			
Maintenance Reviewer	Print	Signature	Date
Implementation and Closure			
PM Coordinator • Asset Suite updated	Print Kim Hall	Signature Kim Hall	Date 1-11-17

1.7 COORDINATION

A. Coordinate connection to water main with the INL CFR.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. PVC, AWWA Pipe: AWWA C900, Class 200, with bell end with gasket, and with spigot end.

1. PVC Fabricated Fittings: AWWA C900, Class 200, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
2. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
3. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

a. Gaskets: AWWA C111, rubber.

4. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.2 JOINING MATERIALS

A. Plastic Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

2.3 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
B. Tubular-Sleeve Pipe Couplings:

1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be joined.

a. Standard: AWWA C219.

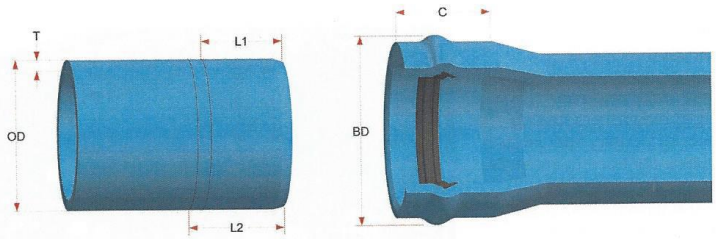
North American Pipe Corporation

MUNICIPAL

PRODUCT SPECIFICATION

AWWA C900/IB PVC Pressure Pipe

GASKETED INTEGRAL BELL



C900/IB PIPE DIMENSIONS & PERFORMANCE

Nom. Size	Outside Diameter (OD)	DR	Pressure Class (psi)	Min. Wall Thickness (T)	Internal Diameter (ID)	Approx. Bell Diameter (BD)	Bell Depth (C)	1st Insertion Mark (L1)	2nd Insertion Mark (L2)
4"	4.800	25	165	0.192	4.416	6.250	5.000	3.375	4.375
		18	235	0.267	4.266				
		14	305	0.343	4.114				
6"	6.900	25	165	0.276	6.348	8.625	5.750	4.625	5.625
		18	235	0.383	6.134				
		14	305	0.493	5.914				
8"	9.050	25	165	0.362	8.326	11.500	7.000	5.625	6.625
		18	235	0.503	8.044				
		14	305	0.646	7.758				
10"	11.100	25	165	0.444	10.212	14.000	7.250	6.125	7.125
		18	235	0.617	9.866				
		14	305	0.793	9.514				
12"	13.200	25	165	0.528	12.144	16.563	8.000	6.875	7.875
		18	235	0.733	11.734				
		14	305	0.943	11.314				

Notes:
1. These dimensions are for estimating purposes only. All dimensions are in inches unless otherwise specified.
2. DR = Dimension Ratio
3. AWWA Pressure Class @ 73°F and includes 2:1 safety factor.
4. Internal diameter calculated using nominal outside diameter and minimum wall thickness.
5. Dimension given for Approx. Bell Diameter (BD) is for highest pressure class.

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www.northamericanpipe.com
1.855.NA4.PIPE (855.624.7473) MU-PS-001 0616

North American Pipe Corporation

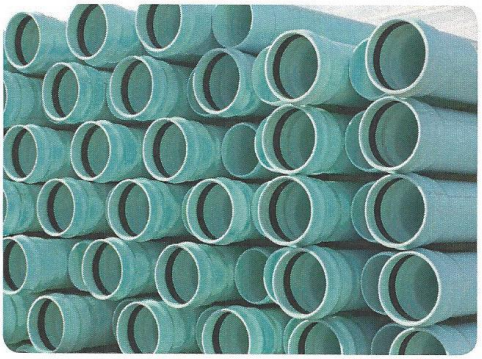
MUNICIPAL

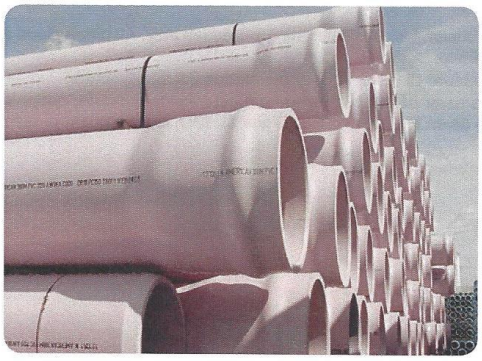
PRODUCT SPECIFICATION

AWWA C900/IB PVC Pressure Pipe
GASKETED INTEGRAL BELL

North American Pipe Corporation's AWWA C900 Gasketed Integral Bell PVC Pipe product line is manufactured to meet the needs of modern municipal water, wastewater, and reclaimed water systems. With top quality raw materials and modern processing technology, our C900 pipe meets all industry standards in addition to our own rigorous quality control requirements.

Our C900 pipe utilizes Rieber style gaskets throughout the entire product offering to create a leak-free joint.





Short Form Specification	
Pipe Standard:	AWWA C900
Diameter Std.:	Cast Iron Outside Diameter (CIOD)
Nominal Sizes:	4", 6", 8", 10", 12"
Dimension Ratios & Pressure Ratings:	DR 25 – 165 psi DR 18 – 235 psi (150 psi)** DR 14 – 305 psi (200 psi)**
Lay Length:	20'
Pipe Compound:	ASTM D1784 Cell Class 12454
Pipe Joint Std.:	ASTM D3139
Max. Angular Joint Deflection:‡	1°
Gasket Standard:	ASTM F477, UL 157
Gasket Material Offerings:	Standard – SBR Optional – NBR or EPDM
Installation Std.:	AWWA C605

Applications	Potable Water	Waste-water	Reclaimed Water
Color:	Blue	Green	Purple
Certifications:	NSF 14* NSF 61 UL 1285 FM 1612**	None	None

**NSF 14 certified products must be requested at time of order.*
***FM 1612 does not include DR 25 and reclassifies DR 18 as 150 psi and DR 14 as 200 psi.*
‡See Installation Guide for more information.

NSF UL FM APPROVED

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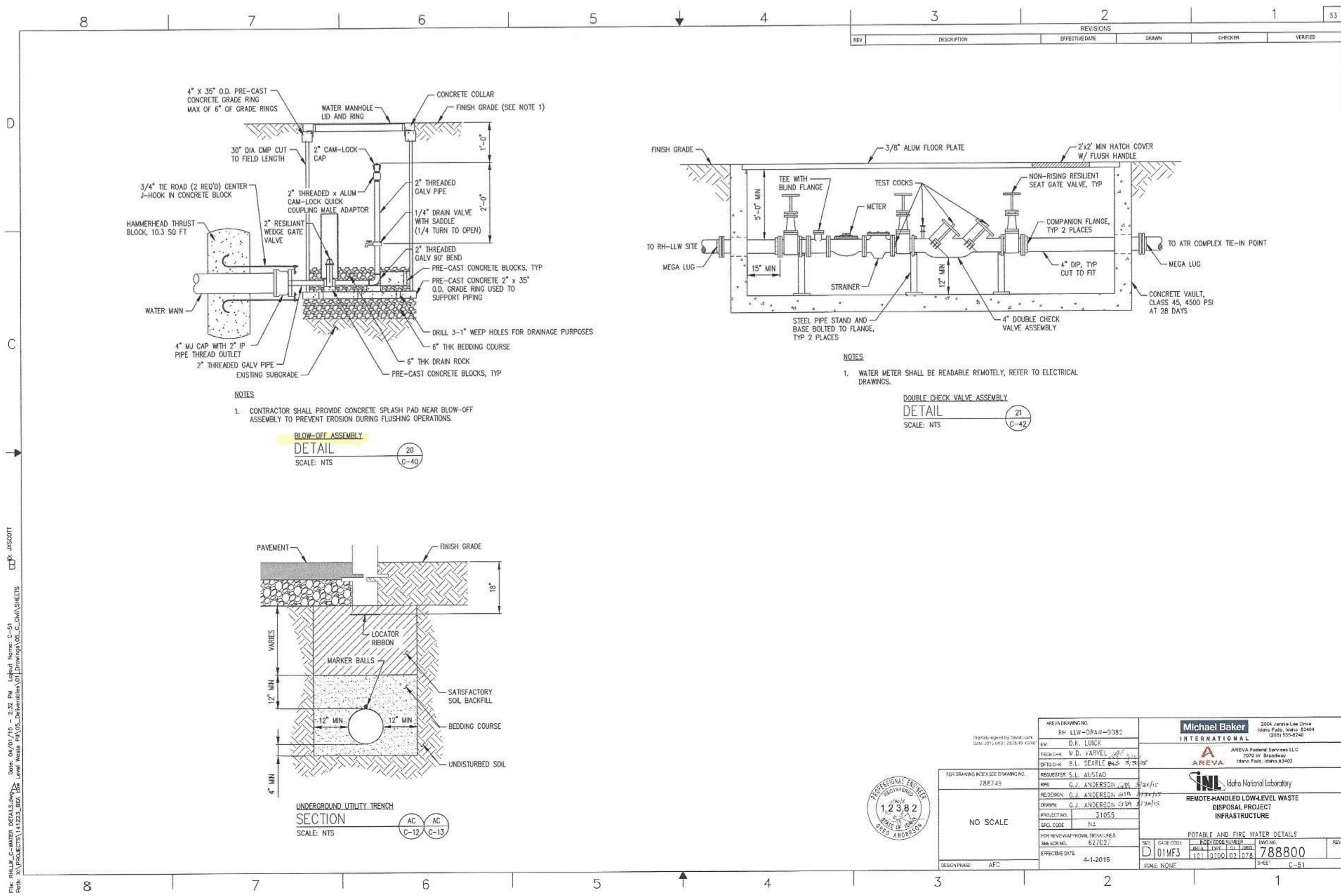
1.855.NA4.PIPE (855.624.7473) MU-PS-001 0616


REVISIONS
REV DESCRIPTION EFFECTIVE DATE DRAWN CHECKER VERIFIED
4" X 35" O.D. PRE-CAST CONCRETE GRADE RING MAX OF 6" OF GRADE RINGS
WATER MANHOLE LID AND RING
CONCRETE COLLAR
FINISH GRADE (SEE NOTE 1)
30" DIA CMP CUT TO FIELD LENGTH
2" CAM-LOCK CAP
3/4" TIE ROAD (2 REQ'D) CENTER J-HOOK IN CONCRETE BLOCK
2" THREADED x ALUM CAM-LOCK QUICK COUPLING MALE ADAPTOR
2" THREADED GALV PIPE
HAMMERHEAD THRUST BLOCK, 10.3 SQ FT
2" RESILIANT WEDGE GATE VALVE
1/4" DRAIN VALVE WITH SADDLE (1/4 TURN TO OPEN)
2" THREADED GALV 90° BEND
PRE-CAST CONCRETE BLOCKS, TYP
PRE-CAST CONCRETE 2" x 35" O.D. GRADE RING USED TO SUPPORT PIPING
WATER MAIN
DRILL 3-1" WEEP HOLES FOR DRAINAGE PURPOSES
6" THK BEDDING COURSE
4" MJ CAP WITH 2" IP PIPE THREAD OUTLET
2" THREADED GALV PIPE
6" THK DRAIN ROCK
EXISTING SUBGRADE
PRE-CAST CONCRETE BLOCKS, TYP
1'-0"
2'-0"
NOTES
1. CONTRACTOR SHALL PROVIDE CONCRETE SPLASH PAD NEAR BLOW-OFF ASSEMBLY TO PREVENT EROSION DURING FLUSHING OPERATIONS.
BLOW-OFF ASSEMBLY
DETAIL 20 C-40
SCALE: NTS
FINISH GRADE
3/8" ALUM FLOOR PLATE
2'x2' MIN HATCH COVER W/ FLUSH HANDLE
TEE WITH BLIND FLANGE
TEST COCKS
NON-RISING RESILIENT SEAT GATE VALVE, TYP
METER
5'-0" MIN
COMPANION FLANGE, TYP 2 PLACES
TO RH-LLW SITE
TO ATR COMPLEX TIE-IN POINT
MEGA LUG
15" MIN
4" DIP, TYP CUT TO FIT
12" MIN
STRAINER
CONCRETE VAULT, CLASS 45, 4500 PSI AT 28 DAYS
STEEL PIPE STAND AND BASE BOLTED TO FLANGE, TYP 2 PLACES
4" DOUBLE CHECK VALVE ASSEMBLY
NOTES
1. WATER METER SHALL BE READABLE REMOTELY, REFER TO ELECTRICAL DRAWINGS.
DOUBLE CHECK VALVE ASSEMBLY
DETAIL 21 C-42
SCALE: NTS
PAVEMENT
FINISH GRADE
18"
LOCATOR RIBBON
VARIES
MARKER BALLS
12" MIN
SATISFACTORY SOIL BACKFILL
12" MIN
BEDDING COURSE
UNDISTURBED SOIL
4" MIN
UNDERGROUND UTILITY TRENCH
SECTION AC C-12 AC C-13
SCALE: NTS
NO SCALE
RH LLW-DRAW-0082
D.K. LUICK
M.D. VARVEL
B.L. SEARLE
S.L. AUSTAD
G.J. ANDERSON
G.J. ANDERSON
G.J. ANDERSON
788749
31055
NA
627027
4-1-2015
AFC
Michael Baker INTERNATIONAL
2004 Jennie Lee Drive Idaho Falls, Idaho 83404 (208) 535-8240
AREVA
AREVA Federal Services LLC 2070 W. Broadway Idaho Falls, Idaho 83402
INL Idaho National Laboratory
REMOTE-HANDLED LOW-LEVEL WASTE DISPOSAL PROJECT INFRASTRUCTURE
POTABLE AND FIRE WATER DETAILS
D 01MF3 121 0300 02 078 788800
SCALE: NONE
C-51
PROFESSIONAL ENGINEER REGISTERED 12382 STATE OF IDAHO GREG ANDERSON

Calculation: Flush of RHLLW Potable Water Supply Line

This calculation is for the RHLLW potable water line from the connection inside ATR to the blowdown assembly at the RHLLW facility

REFERENCES

- INL Drawings 788789, 788790 and 788791
- Vendor Data VDR-508630; VDS Item #49
    - North American Pipe Corp; AWWA C900 PVC; 4-inch DR 14 Product Specs: ID=4.114-in = 0.343 ft.

Piping Lengths (feet)

- Drawing 788789: 210 + 310 + 750 = 1270
- Drawing 788790: 576 + 43 + 122 + 349 = 1090
- Drawing 788791: 143 + 256 + 142 + 98 + 20 + 11 = 670
- Total length: 1270 + 1090 + 670 = 3030

Line Volume to Flush

$(\pi/4)(dia^2)Length \rightarrow (\pi/4)(0.343\ ft)^2(3030\ ft) = 279.98\ ft^3$

1 Line volume = $279.98\ ft^3$ (=2094 gallons)

Flush Rate at 2.5 ft/s

$(\pi/4)(0.343\ ft)^2(2.5\ ft/s) = 0.231\ ft^3/s$

$(0.231\ ft^3/s)(7.481\ gal/\ ft^3)(60\ s/min) = 103.7\ gpm$ (=13.9 cfm)

Flush 1 Line Volume with Minimum of 2.5 ft/s (103.7 gpm) (13.9 cfm)

$(279.98\ ft^3) / (13.9\ ft^3/min) = 20.1\ min$

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Appendix H

List of Drawings

The following INL drawings are applicable to the RHLLW potable water system:

788789, Remote-Handled Low-Level Waste Disposal Project Infrastructure Potable Water Plan 1

788790, Remote-Handled Low-Level Waste Disposal Project Infrastructure Potable Water Plan 2

788791, Remote-Handled Low-Level Waste Disposal Project Infrastructure Potable Water Plan 3

788800, Remote-Handled Low-Level Waste Disposal Project Infrastructure Potable and Fire Water Details

808182, ATR RHLLW Disposal Facility (RDF) BLDG 630 & BLDG 631 Potable Water P&ID